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ABSTRACT

This volume, the seventh in a series, is the first yearbook published after the Southwest Reading Conference for Colleges and Universities was changed to the National Reading Conference for Colleges and Adults. All of the fourteen papers and reports presented at the annual meeting in December 1957 are included in this volume. Among topics covered by the papers are a summary of a decade of progress in college and adult reading programs, characteristic elements of the programs, the relationship of high school and college programs, television as a medium for improvement of reading ability, expansion of reading services in industry and the military as well as other government services, and recent research in reading. (JM)

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# SIGNIFICANT ELEMENTS
# IN
# COLLEGE AND ADULT READING IMPROVEMENT

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The

SEVENTH YEARBOOK

of

THE NATIONAL READING CONFERENCE

for

COLLEGES AND ADULTS

Edited by

**Oscar S. Causey**

Texas Christian University

Published by

TEXAS CHRISTIAN UNIVERSITY PRESS

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# SIGNIFICANT ELEMENTS

# IN

# COLLEGE AND ADULT READING IMPROVEMENT

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# PREFACE

This volume, which is the seventh in the series of yearbooks, is the first yearbook published after the Southwest Reading Conference for Colleges and Universities was changed to the National Reading Conference for Colleges and Adults. All earlier volumes were published as yearbooks of the Southwest Reading Conference.

All of the papers and reports given at the annual meeting at Texas Christian University, December 5-7, 1957, are included. The program committee, while planning the program for the annual meeting and the yearbook, was of the opinion that a report summarizing the progress made within the last decade in college and adult reading programs, should be made and that characteristic elements in reading programs, as they are functioning at the present time, should be identified. The first two articles in the volume relate to these two topics.

Invitations to attend the seventh annual meeting were extended to representatives of selected public school systems in Oklahoma, Arkansas, Louisiana, and Texas for the purpose of considering reading problems found to be common to high schools and colleges. Thirty superintendents, principals, advisers and special reading teachers accepted the invitation and participated in the meeting. Relationship of high school and college reading programs was the central theme of a paper at a general session and of two special group discussions. A report on television, as a medium for improvement of reading ability, was given careful consideration at the meeting. The first report, on improvement of reading by television, published by the Conference is contained in this volume.

The expansion of reading services in industry and the military, and other government services, is significant. The progress made in these areas is reflected in the following pages.

One of the major purposes of the Conference is to give encouragement to research and experimentation in

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the field of reading, and to publish the results. A number of such reports are included in this volume. The success of the National Reading Conference is due in very large part to the persons who prepare and present papers, at the annual meetings, for discussion and for publication in the yearbooks.

Oscar S. Causey

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# A Decade of Progress in College and Adult Reading Improvement

EDMUND N. FULKER
U. S. Department of Agriculture

Since words mean different things to different people, it seems desirable to define some of the words in the topic of this paper. The word "decade" will be used rather loosely. Since very little was done in developmental reading at the college and adult levels prior to 1945, this will be the beginning date of my decade and it will be stretched to the present. My use of "college and adult reading improvement" will be restricted to developmental reading activities — procedures, techniques and materials used to help the average, slightly below average, and superior college and adult readers to improve their skills and abilities. This leaves the key word in the title to be defined — "progress." We shall think of progress as a gradual improvement or advancement of the reader toward an objective or a goal.

First, I shall review some of the increases reflected in the published literature; then, the number and variety of reading-improvement programs and courses offered; third, the increases and changes in the number and variety of instructional aids and materials; and, finally, the increase in professional competence and opportunities for professional development.

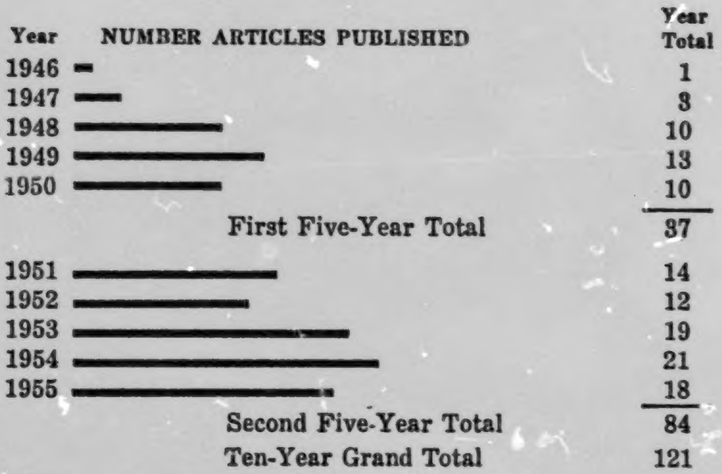
To the casual observer, the many increases and changes we have witnessed might be viewed as synonymous with progress. It should be cautioned therefore that an increase, per se, does not necessarily result in progress. Likewise, a change, in and of itself, does not necessarily mean progress. For progress to occur, quality, as well as quantity must be considered. I will restrict myself to reviewing some of the quantitative progress we have made. With a minimum of evaluation on my part, let us first review some of the increases and changes that are reflected in the published literature of the past decade.

## A Look at the Periodical Literature

While assisting in a course conducted by the writer at The American University, Mr. Harvey Mueller, a Master's candidate, undertook a very thorough and exhaustive study of the literature on college and adult developmental reading improvement for the period 1946-1956. He examined over 700 titles and found a larger body of literature than either of us anticipated. There were at least 478 articles dealing with college and adult developmental reading. These appeared in 146 publications, with 50 per cent appearing in 20 periodicals. The Journal of Education Research led with the most articles printed, followed by School and Society, Journal of Educational Psychology, Education, and Optometric Weekly, in that order. These were followed by Educational and Psychological Measurement, College English, American Journal of Optometry, English Journal, Junior College Journal, and the American Psychologist.

Mr. Mueller, in his unpublished report, makes a strong point that while these journals printed the most articles, they were not necessarily the best articles. He found and reviewed 132 articles on the adult area alone and judged 29 to be most significant. Thirty-seven were published during the first five-year period. During the second five-year period the total number of articles increased to 84 — more than twice as many as appeared during the previous five-year period.

The following chart shows the number of published articles on adult reading, by year of publication.



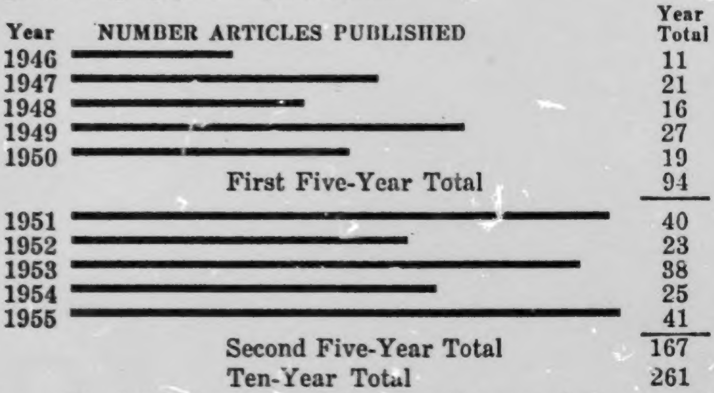
Note: Due to a publication lag of up to 18 months and since the library research phase of this study was completed, in late 1956, some 1956 articles have been missed. Therefore, information on 1956 has been omitted from the charts.

Mr. Mueller classified them into the following categories:

36 per cent were basically program descriptions
33 per cent were general discussion articles
20 per cent were primarily research
11 per cent dealt with techniques and methods

In the area of college reading improvement, he found a total of 261 articles -- more than twice the number in the adult reading category. Again, there was a sharp increase in the number of articles published during the second five-year period.

The following chart shows the published literature on college reading by year of publication.



The total almost doubled during the second five-year period.

| | |
|---|---|
| Total of College Articles | 261 |
| Total of Adult Articles | 121 |
| Total | 382 |

As reflected by the literature, there seemed to be an increase in both college and adult reading training. Of the two, adult reading training seems to have grown at faster pace during the second five-year period. During the first five-year period, the adult literature was only 39 per cent of the total. In the second five-year period, articles on adult reading had increased proportionately and account for about 50 per cent of those published.

Texts and workbooks published during this period will be covered later under the section "Teacher Aids and Materials."

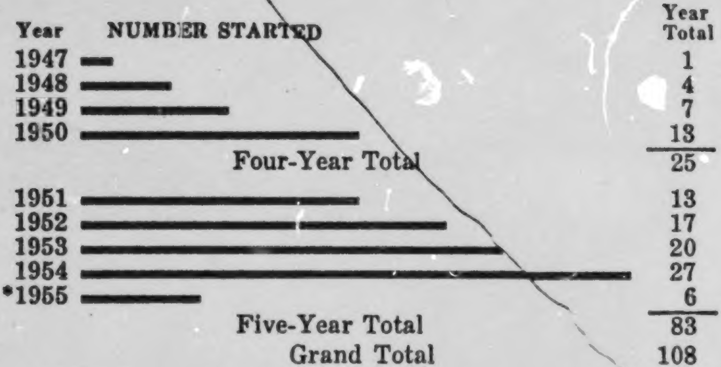
## Increases in the Number of Programs and Courses Offered

Information about the exact number of college and adult reading improvement programs and courses offered during the decade is not readily at hand. In 1951, School and Society reported the results of W. Barbe's survey of 95 major colleges and universities. About 36 reported having a developmental reading course. Half of these had been set up since 1945. In 1955, School and Society reported the results of a second survey of reading clinics by W. Barbe. Barbe has compiled a Directory of Reading Clinics obtainable from the University of Chattanooga.

In the Fifth Yearbook of the Southwest Reading Conference, O. S. Causey published the results of two surveys he conducted to determine the extent of developmental reading training in colleges, universities and representative junior colleges. The periods covered were the 1954-55 session and the 1955-56 session. In Causey's words, "Replies were received from 575 colleges in 45 states and the District of Columbia. Four hundred eighteen institutions reported reading improvement programs in progress (in 1955-56 session) as compared with 268 a year earlier. Enrollment in courses was reported as 57,052 students as compared with 33,341 a year earlier."

Thus, there were 150 more courses reported in the 1955-56 session. In one year the reported number of students enrolled increased by nearly 24,000.

At the adult level, at least two surveys were conducted. As a result of a 1955 survey, Mr. Ralph Acker of the Engineer School, Fort Belvoir, Virginia, reported results from 108 programs in government and industry. Replies represented 27 states plus the District of Columbia and Canada. The following chart shows the years the programs were started.



*To April.

Note: The number of programs started during the second five-year period (83) is more than three times the number started during the earlier five-year period (25). His survey has not been published, but copies of his findings were distributed to those contributing information. Mr. Acker is presently engaged in a more extensive survey, which may be available soon.

In the Sixth Yearbook of the Southwest Conference, Mr. Harry O. Patterson reported the results of a 1956 survey he conducted of 165 representative companies in industry. He received 132 replies. Twenty-six companies reported a program in session. Fifty-two reported having had one during the past five years. A total of 59 per cent had given training during the 1950-56 preiod. Fourteen reported plans for reading training and 28 others reported they would like to be given help by a consultant.

In the same yearbook, Mr. R. Lawrence Dowell reported 23 adult reading programs in operation, in government, in the Washington, D. C., area alone. The Air Force program in the Pentagon was the first to be set up in the area. It started in May, 1949, and is still in operation.

Scattered through the literature are reports of adult reading improvement courses offered by public schools and adult education agencies.

An increasing number of courses are being offered through libraries. In 1955, the Brooklyn Public Library received a grant from the Carnegie Foundation to see if the library is the logical place to develop reading improvement programs for the general public. The study is to last three years. It is to be conducted in cooperation with Brooklyn College psychologists and reading clinicians who will render guidance, and evaluate the results at the end of the three-year period. Libraries and librarians seem to be assuming an increasingly active role in stimulating and guiding readers. For example, for years libraries have been the meeting places for the majority of Great Books, and other discussion groups.

More recently, television has entered the scene as a new media for reaching more people. Mr. R. W. Bolling, in the October, 1955, issue of Educational Screen, described his experience in teaching rapid reading over a commercial channel. More recently, Mr. E. N. Fulker, in the October, 1957, issue of Adult Leadership, reported the experiences of a cooperative program planned and presented over a District of Columbia commercial channel by reading specialists of five area colleges and universities.

Recently, a letter was received from Mr. Charles Mitchell of the Knoxville Center of the University of Tennessee, who is planning a course over a Knoxville channel. Another letter was received from Mr. Kenneth King of the Detroit Public Library indicating that they, too, were planning a television reading-improvement course. There are undoubtedly others.

Dr. Nila B. Smith of New York University reported that a countrywide survey of educational TV stations, colleges and public schools had been conducted to determine what had been done. The results of the survey have not been published.

Use of TV for teaching reading to the functionally illiterate adult, to elementary school children and to teachers were also reported. In fact, the theme of the October, 1957, issue of the Reading Teacher, published by the International Reading Association, is "Television and Reading."

In 1956, four papers on teaching reading by television appeared on the program of the annual conference of the International Reading Association. These appear in "Better Readers for Our Times," the proceedings of the annual conference, published by Scholastic Magazines. One of the sectional meetings at this conference is entitled, "Television and Reading Improvement."

## Increases in the Number and Variety of Instructional Aids and Materials

Impressive increases have also occurred in the number and variety of tests, workbooks, texts, pamphlets, special exercises and mechanical aids. Publications like the Atlantic, Reader's Digest, Factory Management and Maintenance, Supervisory Management and others have offered a form of reading training to their readers. Correspondence courses, home study kits and packaged reading programs have been developed and used. Let us review some of the highlights:

**Tests.** In addition to the many widely known reading tests such as the Cooperative, Diagnostic, Harvard, Michigan, Minnesota, Robinson, and Air Force tests, the Perceptual Development Laboratories have recently published five comparable reading rate tests. Cosper and Griffin have four equated reading rate tests in their workbook, "Toward Better Reading Skill." Dr. Spache is attempting to refine his Reading Flexibility Test. Hoefter has reported work on tests in reading in commerce; Dunlap, on a test for supervisors. The Educational Development Laboratories is purportedly developing a portable polaroid eye camera. Purdue University has developed, and is using, an Electro-Oculograph for recording the eye movements of readers under more normal conditions than is provided by the Opthalmograph Eye camera.

**Workbooks and Texts.** A sharp increase has also occurred in the number of workbooks, texts and pamphlets published during the past decade. The number of workbooks and texts published during the second five-year period (1951-1955) more than tripled the number published during 1946-1950. Nine were published during the first five years as compared with 28 during 1951-1955. In fact, more workbooks and texts appeared last year (1956) than appeared during the entire 1946-1950 period. Dr. Lyle Miller, in the Sixth Yearbook of the Southwest Conference, has a descriptive listing of 33 of the more than 50 workbooks and texts now available. Several new books have appeared during the past few months and one, on business reading, by Dr. Spache, will be completed soon.

**Mechanical Aids.** In this, the age of automation, mechanization of reading training was perhaps inevitable. Springing from the Buswell board, the Metronoscope and Renshaw's tachistoscope, a vast array of mechanical aids have appeared on the market.

Basically, they fall into several categories:

A) Accelerators, controllers or pacers for individual near-point training. Representing this group are: 1) The Stereo Optical Company "SO-2 Controller;" 2) The Science Research Associates "Accelerator;" 3) The Audio-Visual Research "Rateometer." All of these employ an opaque shutter which descends over the page of print. 4) The Keystone View Company "Reading Pacer" uses a wire bar and thus more closely approximates the normal reading situation. 5) The Psychotechnics, Incorporated, (formerly Lafayette Instrument Company) "Shadowscope Reading Pacer" uses a beam of light to pace the reader. This is perhaps the closest thing to normal reading of the instruments mentioned in this category. I understand the Hamilton Company of California is soon to come out with another instrument of this type. SRA also has a cheaper "Hand Accelerator" in the experimental stage of development.

B) Tachistoscopes or flashmeters fall into three categories—1) Those that provide individual near-point training at normal reading distance, like the Stereo Optical Company "Tachitron;" 2) Those that provide group training at far-point, like the Keystone "Overhead Tachistoscopic Projector," the Educational Laboratories "Timex," and the Perceptual Development Laboratories "Perceptoscope;" 3) Those that provide training at an intermediate distance from two to several feet. There are several of these. Most of them are 35mm. slide projectors with a cemera-shutter attachment.

C) Reading Training Films include the Harvard Series, Iowa Series and the more recent sets put out by Purdue University—one for the High School Level and the other for College and Adult use. Another set of six films has been developed by Marquette University. Others have been developed or are in the process of development.

**Package Programs.** Several package reading programs have appeared recently. Examples are those of—1) The Perceptual Development Laboratories. This program centers around their multipurpose projector called the "Perceptoscope." It incorporates the principles of the reading rate controller, the group tachistoscope and reading films. The program also includes the use of a booklet of 12 rapid-reading exercises and five rate tests for measuring progress. 2) A similar program has been developed by the Educational Development Laboratories which centers around their "Controlled Reader" and "Timex" instruments. More recently, a more individualized near-point (reading distance) package program has been developed by the Reading Laboratory of New York. Its basic elements include a short pamphlet on reading principles, individual reading pacers, individual near-point tachistoscopic devices, and a tailormade series of 10 rapid reading practice articles.

In the Sixth Yearbook, Patterson reported on the General Motors' no-equipment program. More recently, the Bureau of Veterans Benefits, Veterans Administration, has launched a nationwide individualized program for its employees. Individual pacers, tachistoscopes and workbooks are used. I understand that for several years the Marine Corps, on a limited basis, has offered a correspondence course through their reading laboratory at headquarters in Washington, D. C.

A Home-Study Reading Kit has been developed and sold commercially by the Foundation for Better Reading. It consists of Baker's manual, "Reading Skills," and a hand tachistoscopic device.

As lengthy as this array may be, it is by no means exhaustive. The novice teacher entering the college or adult reading training field at this time is faced with a formidable array of mechanical devices and materials to examine and decide upon.

As a result of this mushrooming of interest and activity in college and adult reading, workers in the field soon began to visit and correspond with each other to exchange ideas and materials. A felt need for professional development opportunities soon developed.

## Increases in Professional Development Opportunities

Without doubt, the outstanding focal point for professional development has been this very organization. In the fall of 1951, Causey wrote the directors of several reading programs to determine their interest in a group conference. In April, 1952, Texas Christian University was host to 44 people representing five states. This was the birth of the Southwest Reading Conference.

This year, 130 attended the conference meeting, representing 21 states and the District of Columbia. To further evidence its growth, in the spring of this year the name of the organization was changed from the Southwest Reading Conference to the National Reading Conference.

Each year the conference has published a yearbook of its proceedings. These six yearbooks, together with the Forty-eighth and Fifty-fifth Yearbooks of the National Society for the Study of Education, serve as the best compilations of information on college and adult reading improvement to date. (Both the Forty-eighth NSEE Yearbook, "Reading in the High School and College," and the Fifty-fifth Yearbook, "Adult Reading," are distributed through the University of Chicago Press.)

In October, 1957, another landmark of progress was made. The first issue of the "Journal of Developmental Reading" was published. This is a quarterly published by the Developmental Reading Staff, Department of English, Purdue University.

We now have a national annual conference for meeting and exchanging ideas with our colleagues from all over the country, and a journal outlet for publishing the results of our experiences, research and ideas.

Also, on a national basis, college and adult reading improvement training seems to have found a continuing place on the agenda of other conferences and meetings. For example, the American Society of Training Directors has devoted part of its annual conferences to discussions of reading training. In Boston, in 1953, the conference heard from Mr. John W. Rice of Mutual Life; Mr. Samuel Joslow of the Reading Institute of Boston; Mr. William G. Perry of Harvard; Mrs. Schuman and Mrs. Downes of Cambridge Education Services, producers of the Atlantic Guide series on reading. This past year, at Fort Worth, Causey, Mr. H. O. Patterson of General Motors, and Mr. Taylor, of the Educational Development Laboratories, gave addresses. At the coming 1958 meeting, the writer has been asked to organize a program for the meeting in Washington, D. C., in May, 1958.

Reading training has also found places on the program of many other conferences and meetings. Dr. William S. Gray, in the October issue of the Reading Teacher, reported that

Dr. Ralph Staiger found that at least 55 conferences were planned for this past summer. How many of these included topics relating to developmental reading is not indicated.

In Washington, D. C., an Adult Reading Improvement Association has been meeting regularly since May, 1956, when E. N. Fulker and the Headquarters, Air Force Reading Laboratory, played host to a meeting of training officers and area university reading specialists to discuss mutual problems and exchange ideas. A few months ago, the group decided to circulate a monthly informal news bulletin. The group has representatives from about 24 different reading courses offered in government in the D. C. area, plus reading specialists from area colleges and universities.

Thus, there seems to be an increasing number of conference meetings, attended by more people, with printed proceedings, reaching unknown thousands of teachers.

At least one institution, Purdue University, now offers a graduate degree with specialization in Developmental Reading.

Patterson, in his survey of industrial programs, mentioned earlier, forecast an increasing demand by industry for the services of reading specialists and consultants. Kathryn Dever's findings, published in her book "Positions in the Field of Reading" (Bureau of Publication, Teachers College, Columbia University, 1956), also agreed. She indicated that positions are increasing constantly, particularly in the area of developmental reading at the high school, college and adult levels.

Whether or not the tidal wave of increased interest and activity in college and adult developmental reading has reached its peak is hard to determine at this time.

If we restrict ourselves to the quantitative aspects of the definition of progress, we must admit that college and adult developmental reading has come of age.

# Significant Elements in Reading Programs

RALPH C. STAIGER

Mississippi Southern College

One of the most dangerous occupations a person can pursue is that of predicting the future. Political analysts predict election returns, lovers of horseflesh bet on the outcome of a race, investors attempt to outguess the fluctuations of the stock market. The history of these occupations is fraught with bankruptcies, even when predictions were based upon the best available evidence in terms of past performance, current trends, and present conditions. The future holds so many unknowns that only the foolhardy rush in to describe it.

Consequently, in discussing college and adult reading programs, I shall avoid predicting the future, for the odds are too great, and the real evidence too scanty for any but the most reckless gambler to make a guess worth listening to.

Instead, I shall attempt to evaluate some of the elements in college and adult reading programs in terms of my own opinions. Those developments which I consider favorable will get my blessing. Trends which I discern but do not favor will be mentioned in the hope that others who are similarly minded will be moved to act, when action is possible.

**Attitudes.** On the favorable side of the ledger are the attitudes of teachers of reading courses. None of us believes that we are doing the best possible job of teaching our courses. We are here to find out what others are doing, what new ideas are being considered, and what new materials are being made available to us. The individual who comes to this meeting of the National Reading Conference with a preconception that he will find the final answer, the ultimate reading program, is doomed to disappointment. None of us is complacent about what we are doing. This is a sign of healthy growth.

**Emphasis.** In the early stages of college and individual reading programs, increasing the speed of reading was often the prime objective. Comprehension was often a side issue, an after thought. While increasing rate is still a consideration, the emphasis has changed to increasing efficiency of reading. Fostering the student's understanding of what is being read has taken the forefront. The reader's awareness of the purposes for which he is reading, his approach to the organization of the selection, and his using the most efficient reading tools, in various situations, has become the objective of many reading courses. No longer do we say that as speed is increased, efficiency will naturally follow. Instead, we contend that as the reader's awareness of the skills required to achieve the task at hand develops, his reading efficiency grows. When he can effectively skim a page because he anticipates the organization of the writer, his reading rate advances apace. The nature of a reading program often undergoes subsurface changes as the persons in charge develop new insights into the nature of reading. Many a program has used a shotgun approach at the beginning, only to change its emphasis when the instructor, in the light of his experience, learned that using the same materials in the same machines for all students did not achieve the desired results.

**Student Reactions.** Some reading programs, usually those sponsored by psychology departments, have emphasized the personality aspects of reading improvement. Poor readers, it is implied, are primarily poorly adjusted individuals who need to be reassured of their personal worth. We have all known students like this, and it is significant, I believe, that some materials designed for reading courses include selections which reassure the learner that he can make a good adjustment to college work. Every good teacher has done this. Perhaps these materials merely supplement our efforts.

**Machines.** Mechanical aids were once considered the backbone of a reading program by many instructors who have come to realize that reading is an intellectual task rather than a mechanical one. Machines which prove to a student that he can use his eyes faster than he thought possible are extremely useful in convincing him that his old method of reading word-by-word is wasteful. Reading films and other pacing devices serve the same purpose, but rarely are the machines expected to do the entire job. Machines have rightly become the handmaiden of the reading teacher, motivating the student and proving to him what he can do in improving his rate of comprehension. We are concerned with eye movements as they are symptoms of difficulty in reading, not as causes of that difficulty.

On the debit side of the ledger I can find several elements which bear close scrutiny. Perhaps some of these are being changed, but I cannot notice tendencies which can correctly be labeled trends in the right direction.

**Academic Acceptance.** As far as academic acceptance in our colleges and universities is concerned, we are still neither fish nor fowl. In some places, English departments have incorporated reading courses into their fold; guidance services provide reading improvement courses in other schools. Education or psychology departments have academic responsibility for reading in some, while the reading laboratory is responsible only to the dean or president in a few colleges. In many places, academic acceptance of reading improvement courses is questioned because other schools do not have courses in the same department. Where English departments are oriented toward communication, they have sometimes offered reading courses at home. Many freshman English courses include a limited degree of reading instruction in their course work. But in too many schools, English teachers are primarily concerned with literary criticism, and do not wish to concern themselves with improving reading.

Industry and government programs do not appear to have the same problem. Their training departments are the natural habitat of a reading program. But college programs have not yet found a secure place in the academic heavens.

**Communication.** Another problem we face is that of letting other persons know what we are doing. Although we have come far from the status of "remedial" reading, still referrals come from well-meaning colleagues who send us persons with grave reading disabilities, expecting us to remedy the problem with a course designed for an entirely different purpose. A need exists for educating our colleagues as to the function of a developmental reading course. We must remember that we have a new idea with which our colleagues have had no experience. There is a need for open communication lines with our colleagues, so that they know what we are doing.

**Materials.** The materials we use have grown in numbers available. Most of us are not satisfied with what we use, however. Often the materials are not sufficiently diverse for the groups we teach. Sometimes they do not offer enough practice material in an area we stress. Some contain selections too difficult for students' speed practice. No one has developed a full-flown set of college reading selections which can be used to teach many skills to persons at many different ability levels. Most of us have found that no one set of materials is optimum for teaching all of the students in our classes.

**Research.** We will hear summaries of research during our program, and we will hear reports of research carried out by our members. But most of what we hear will deal with gains made on certain satndard tests in courses we have offered. Too little effort is being devoted to research dealing with basic comprehension skills and abilities at the college and adult level. Little research is reported on the various types of reading necessary in different jobs, whether in industry or in college. Little basic research in the psychology of learning, which might vastly change our ways of teaching reading to college students and adults, is reported. To a great extent, our teaching techniques are similar to those used with elementary and high school students. Does research condone this practice?

Lest these comments seem querulous, let me one again state what I have tried to do in this paper. I attempted to discern trends upon which the future of adult reading courses might be predicted. I found no clear tendencies. Therefore I took the easy way out and reported my personal reactions to elements in college and adult reading programs for your consideration.

# The Relationship of High School and College Reading Programs

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It is commonly recognized that because of the complexity of the factors involved, the successful development and acquisition of reading skills results from a longitudinal process. As a result, almost every educator, regardless of whether he specializes in elementary, secondary, or higher education, subscribes to the concept, "developmental reading." Too often, however, the concept is misinterpreted or only partially understood. Fundamental to this concept is the realization that an instructional program in reading must be intimately related to the child's rate of development and maturation. The developmental patterns of children vary noticeably, and numerous psychological, social, and physical factors have been identified as being closely correlated with the growth process. Many of these same factors have been identified as being highly correlated with the probability of a child's successful acquisition of reading skills. Intelligence, good physical health, freedom from visual and hearing impairments, language facility, mental health in the form of a wholesome concept of self, and the socio-economic and cultural status of the home, all have been discussed frequently.

It is commonly recognized that because of their complexity, reading skills must be acquired in a sequential order, with certain subskills mastered before new ones are acquired, and the new skills integrated with the old. All basal reading programs are built on this principle. Most reading programs tend to follow the general outline suggested by the authors of the Twenty-fourth Yearbook of the National Society for the Study of Education.[1] In this work, five stages of development were suggested: (1) preparation for reading, including language development and other readiness concepts; (2) a period of initial instruction designed to teach mastery of fundamental word-recognition skills; (3) a period of rapid growth in skills, habits, and attitudes; (4) a period of extended reading, and finally, (5) a period in which specific attitudes and habits are refined through application. These stages have been employed as a basis for many language arts curricula. Unfortunately, from an instructional viewpoint, individual differences in development among children are such that there is little likelihood that all children in any class will have reached the same stage at the same time. Another difficulty stems from a recognition of the fact that there are no absolutes in reading instruction. Regardless of the teacher's skill and the proven value of an instructional method, some children will tend to learn readily the skill being taught, while other children will not learn it or, if they understand the mechanics involved, will fail to apply them when reading.

Almost all schools still employ one of the least valuable indices—chronological age—as the main determinent of whether a child is "ready" to benefit from the instructional program. In the light of findings about children's learning, such overreliance on this criterion is at best questionable. Over-reliance on chronological age and parental pressures for social promotions result in many primary grade children being promoted before they have mastered the fundamental mechanics of word recognition. These conditions, as well as individual differences in growth and development, compel schools to develop instructional programs designed to meet the individual reading needs of pupils. In such programs, it is axiomatic that each teacher instruct her children in skills which were not learned previously, and to constantly strive to help children to integrate the newly learned skills with those previously mastered. Such a program is the opposite of the one built around the philosophy that, "In the first three years the child learns to read and, after that, reads to learn." In such programs it is understood that many children who have completed the primary grades will have failed to master fundamental skills. Hence they are not ready to enter into a period of rapid growth in the intermediate grades. Therefore, intermediate grade teachers must be prepared to teach certain children the basic mechanical skills of word recognition. Although some children may "catch up" during the intermediate grades, many will fail to do so. The process of "mopping up" must be continued throughout the entire elementary school program, and great heterogeneity in reading achievements must be expected. Teachers must be prepared to deal with this situation.

The problems faced by the intermediate teacher in trying to build fundamental skills among slow-developing and slow-learning children are further complicated by the necessity of extending and further refining the fundamental skills of the so-called average children. We now recognize that all of the reading skills required for mastering the modern curriculum cannot be developed in the primary grades. Increasingly complex concepts, more involved language, and ideas of greater abstraction make heavy demands upon the child. He must be helped to meet these increased demands by learning to refine his reading skills. Not only must word-recognition skills be extended, but flexibility in the mechanics of reading, faster rate, and higher levels of interpretation must be mastered if successful school learning is to take place. In the upper elementary grades, efforts are directed toward these goals. It must be recognized, however, that rarely does any reading program in itself help the child to develop all of the required skills he needs to cope with the varied content of the academic curricula. Rarely is sufficient attention given to pointing out differences in skills and set required to read narrative or literary materials as contrasted to physical or biological science materials. Often more attention must be given to teaching children to read mathematical and scientific problems. Rarely can a child effect an automatic transfer of learning from the methods he has learned in the reading period to efficient reading of geography, history, and science texts.

Many students are enrolled in high schools and colleges who did not go through a period of rapid growth in reading. Some of these students were delayed because they mastered mechanical skills at a later period than most children. Others were handicapped by negative attitudes toward school and toward reading. Still others were victims of adverse cultural conditions. As a result, many high school and college students face the increased required reading assignments with limited resources and mixed feelings. As the mastery of skills, attitudes, and habits learned in the developmental reading program form the foundation for the mastery of complex learning required at these levels, many students find themselves inadequately prepared to do the required study in their chosen course of study. To most high school and college students, the successful "passing" of courses becomes of paramount importance. The development of efficient and effective study skills is important if they are to achieve even this limited goal. The high school, of course, enrolls many students who lack clear-cut educational and vocational goals and who visualize a termination of their formal education before or with high school graduation. Unfortunately, many college students also lack maturity, and clear-cut educational plans. Many are content to just drift along. Such cases, however, seem to represent a smaller percentage than found in the high schools. It seems likely that with increased competition for places in our institutions of higher learning, the present percentage of relatively aimless individuals may be decreased in the future.

A recognition of the importance of teaching effective study skills has led to an emphasis on these factors in most high school and college developmental reading programs. Although study skills grow out of the mastery of general reading skills, they represent a refinement or special application of them. Textbook material of the type required by today's curricula is different from the bulk of printed material which the adult ordinarily encounters. The readability of textbooks is usually more complex and difficult. New words often are introduced, familiar words take on new meanings, more abstract concepts are demanded, sentence structure often is more involved and complicated. Usually, many more facts and details are crammed into a sentence, paragraph, and chapter. In addition, many of the details and concepts presented are ones with which the student has not had first-hand experience. In high school and college, both understanding the detailed facts and remembering them are required for academic success.

Certain methods of study have been developed which are valuable in helping elementary, high school, and college students to master their textbooks. Important assistance can be given by teaching the student to utilize the many aids which all authors and publishers provide. Bold-faced or italicized type commonly are employed to introduce topics, yet few students recognize their value. Graphs and tables are provided to summarize data which otherwise would require laboriously slow reading. Many high school and college students skip over these aids. Most texts provide summaries and discussion questions; few students use them either for previewing the chapter or checking their comprehension of what was read. Probably not one in a hundred students uses the bibliography or list of references for gaining more understanding about obscure facts or highly abstract materials. All of us have experienced a distressing number of students who have only hazy ideas concerning the value or the use of such standard components of texts as the table of contents, index, and appendices. Teaching students to use these aids and providing them the opportunity to practice their use does help them to develop more effective and efficient study methods.

It seems to be a commentary upon our educational system that too often the reading teacher must undertake this task alone. In both high school and college, too often the subject-matter teacher assigns the reading of so many chapters, or even worse, so many pages. Rarely does he spend time showing the student how to use the text efficiently and even more rare is the teacher who furnishes students with a list of thought-provoking questions to guide them in their reading.

As institutions designed to help students to meet the myriad problems which they will face as adult members of a democratic society, high schools and colleges are dedicated to teaching skills and attitudes which will assist students to make wise decisions. Today's society, with its abundance of conflicting opinion, the refinement of propaganda techniques, and the vociferousness of pressure groups, requires that educational institutions train young people to think objectively and to read critically. Too often we hear students submitting the argument that something is true because he read it. In both high school and college, students must be taught the habit of reading critically. They must learn to read with a questioning attitude, to determine whether the material being read is accurate, true or false, subjective or objective, and whether the facts presented are relevant to the conclusions drawn by the author. Such attitudes do not develop spontaneously and must be taught.

All of our high schools and, to an even greater extent, our colleges have expended a great deal of time and large sums of money in developing libraries. The library represents a depository of invaluable information. Many of our students have only a casual acquaintance with it, and many avoid it like the plague. We all have seen students who regard the encyclopedia as the final authority when seeking information for an assigned theme. Rare is the high school student who is on familiar terms with The Readers Guide. Just as rare is the college freshman or sophomore who can effectively use The Education Index, Psychological Abstract, Industrial Arts Index, or other standard references. Such skills can be and should be taught if we are to help students to achieve mature reading skills.

In some high school and college reading programs, major emphasis has been devoted to the development of faster reading rate. Such emphasis is natural because of the increased volume of reading required of students. A recognition of the concepts of developmental reading, however, implies that such limited objectives are insufficient if the diverse needs of students are to be met. If high school and college students are to extend and refine their reading skills to meet the demands of their curricula, additional instruction must be provided. Even more important than reading rate per se is the development of flexible reading habits based upon the recognition of the difficulty level of the material to be read and the realization of one's purpose in reading. The attitude of purposeful reading, coupled with the development and application of efficient and effective study skills, will go a long way toward meeting the needs of high school and college students.

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[1] Twenty-fourth Yearbook, 1925, Part I, William S. Gray, Chairman "Report of the National Committee on Reading."

# Improving Reading Skills in the Subject Matter Areas

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This paper is an attempt to review current efforts to improve reading skills that are significant in the subject-matter areas. There are a number of excellent texts[26] and articles[7 14 22] which summarize what should be done for improving content reading skills. There is little point in reviewing these suggestions and repeating what has already been said on this topic. Hence, we have confined our efforts to the observation of what is currently being done in secondary schools rather than what should be done.

We have reviewed 12 reports of recent programs and several summaries of current reading improvement efforts. These are analyzed in terms of the following facts:

1. What skills and objectives are stressed
2. What organizational arrangements are being used to meet the problem
3. What types of training materials and devices are in use
4. What research problems in content reading are teachers concerned about
5. What are some of the difficulties inherent in attempting to organize such reading improvement programs
6. What interesting or valuable techniques may be found in current programs

**Skills and Objectives:** The aims of these 12 current programs are quite diverse, except for emphasis upon improving comprehension, vocabulary and rate which all programs are intended to do. Objectives mentioned in three programs were improved study techniques, and increased voluntary reading. The remaining aims were subscribed to by only one or two programs. They include writing clearly and effectively, literary appreciation, critical reading, oral communication, library skills, overcoming vocalization, adjusting rate to purpose, concentration, skimming, and personal development through reading.

There is apparently some confusion in the minds of those who plan programs intended to improve content field reading skills. There is a mixture of long-range and immediate goals with little discriminiation between really significant aims or minor skills or reading problems. There is apparently little or no thought about close integration of the reading training or the training materials with the application of reading skills in subject matter areas. It is not surprising that after reviewing a number of programs, Early observes that "Even when instruction is provided for all pupils, provision for transfer of skills to the content fields is usually unsatisfactory."[7] (p 399.)

It is also true that the instruction being offered is not realistically related to the needs of high school or college students as these needs are seen by the students. According to Early's questionnaire, study of what pupils feel they need and what they are being taught, the objectives of current reading programs are not meeting students' felt needs.[8] Students feel that they need training in such skills as increasing vocabulary, accurate pronunciation of long words, expressing themselves, concentration, memory, speed of reading, reference skills and finding main ideas. Of these essentials, only three, vocabulary, main ideas, and syllabication, are being taught to students in more than 50 per cent of our classrooms, according to the students' reports. The list of aims aspired to by current reading programs, as given earlier, and the list of student needs do overlap considerably. But it must be recognized that this list represents 12 sources, and that no one program stresses more than two or three of the students' needs as they see them.

Perhaps students' felt needs are not the best criterion for judging the aims of current programs. Obviously, students do not recognize the significance of such long-range goals as the development of permanent reading tastes and interests, or the ability to read critically and intelligently. Students would naturally be more interested in reading training which could be immediately applied to their school tasks. But there is a point in this comparison of the goals of current reading programs and the needs students feel they have. There is very little emphasis in these programs on training students to apply specific skills in reading in the subject-matter areas. Reading improvement training is generalized. Most of the teachers, the training materials, the organization of the classes and the skills stressed are not related to the study of the subject-matter areas. This point will become even more obvious as we discuss the organization and administration of these reading programs and their teaching materials.

**Organization.** Most of the current reading programs we have reviewed, and those summarized by Early[7] are organized within the framework of the teaching of English. Most programs, whether homogeneous or heterogeneous, are a part of the regular English classes. The obvious reason for this is, of course, the fact that English teachers are considered to be more familiar and competent in this type of instruction. What does not seem so obvious to administrators, however, is that this selection of teachers forces the emphasis toward general reading skills or those most significant in the study of literature. Unfortunately, the ultimate purpose of most reading programs, which is improving the reading of pupils in various subject-matter areas, is defeated by the very selection of the program directors. English teachers cannot be expected to be familiar with the reading demands of a half-dozen content fields. Without special effort, English teachers cannot be expected to train students to use more effective reading habits in other areas.

This is perhaps the most important limitation of current reading programs. To our knowledge, only one large school system in the country, that of Detroit, attempts to aid subject-matter teachers to assume the entire responsibility for improving the reading skills needed for their areas. There are a few other trends in this direction present among the 12 programs we reviewed. Several are directed by a reading coordinator of broad training[10] [20] or offer reading improvement as part of a core program, or relate directly to reading in several content areas.[3] In most schools, however, whether remedial, corrective or developmental groups are formed, whether individualized or group, laboratory, workshop or summer-session instruction is given, that training is most commonly offered by English teachers.

**Training Materials.** Some concept of the content of current reading-improvement programs may be gained by noting the types of training materials used. Six of these programs listed the texts and workbooks used. Of these, three used literature or English textbooks only. In the remaining three, the workbooks and texts used ranged from elementary to college levels. Of the 10 books mentioned, only two, those by Spache and Berg, and Strang, uotch upon reading in the content areas. The rest are practice books in general reading or in improvement of phonics or vocabulary. In addition to these teaching materials, three programs noted the use of the accelerator for improving rate of reading.

It is apparent that only two programs used any materials related to applied reading in any other content field than English. Here again we see that reading improvement programs intended to promote better reading in a variety of subject-matter areas fail to relate to the content of those areas.

**Research Problems.** As chairman of the Committee on Studies and Research of the International Reading Association, last year I conducted a survey of current research among the members of that organization. A brief review of these studies may serve to indicate the thinking of those who are engaged in reading-improvement programs.

In a number of studies at high school and college levels, the basic values of reading-improvement training are being explored. Many researchers are not convinced of the validity of such programs in improving reading skills, or school grades or in contributing to reading interests and habits. On the other hand, many other researchers are more confident of the outcomes of reading-improvement programs and are exploring better methods and materials. Teachers are investigating the merits of small groups vs. large groups, and of mechanical devices vs. textbooks and lectures. They are interested in ways and means of teaching critical reading, listening, and various study techniques such as summarizing. They want to find out whether individualized or self-chosen materials, or those related to the pupils' own personal problems contribute significantly to permanent reading interests.

Much of this research is certainly desirable and will result in better reading-improvement programs. But most of it does not offer any solution to the real purposes of such programs—improving reading in the subject-matter areas. These studies are not discovering methods or materials for teaching students to read or study more effectively in mathematics, in physics, in economics, in history, and any of a half-dozen other fields. For example, how do we teach students to read charts, graphs, tables and diagrams? How should pupils read mathematical problems? What are the most efficient methods for learning formulas or foreign languages? What reference and library skills should be taught to students majoring in different areas? How can we best produce flexibility in relating manner of reading to purpose, or promote intelligent handling of a diversity of reading materials? What are the best approaches to inspiring students to want to learn these essential skills? These are some of the research problems that we feel reading-improvement teachers should be exploring.

**Organizational Difficulties.** In addition to the lack of broadly trained teachers that we have referred to before, there are a number of difficulties inherent in organizing a reading-improvement program. Success of such a program is, in the final analysis, dependent upon the active cooperation and understanding of the faculty and administration. If English teachers are inadequate to direct a broad program of training in reading in all content areas, then they must enlist the support and participation of other teachers. Meeting the reading demands of various content fields can only be clarified and implemented by subject-matter teachers.

Enlisting the support of subject-matter teachers involves in-service training and successful intramural public relations work. These are essential to aid teachers who do not feel qualified to give active instruction in the reading skills demanded by their subject. Subject-matter teachers need summer workshops, pre-training sessions, and continuous opportunity for consultations and discussions. Some of the programs we have reviewed offer a great many suggestions regarding in-service training.[11] [18] [19] [20]

Two other problems inherent in the organization of reading-improvement programs are the selection of cases and the evaluation of the program's results. Most of the programs we have reviewed offer relatively weak solutions to these two problems. For example, Gustafson[11] and Scully[22] selected pupils for training on the basis of one year's retardation in reading below mental age or local norms. This is a very naive interpretation of the significance of a slight difference between two unreliable standards. There is a need here for more careful analytic study of the reading performances of pupils considered retarded in reading. Such factors as socio-economic status, previous schooling, and scholarly motivation are significant influences upon reading success, and must be considered in selecting remedial cases. If we use the simple, arbitrary criteria of mental age and reading level, we are apt to include many pupils that are not truly retarded or those that have no real need for remedial training. The number of cases that really need reading training is so great today that we must use careful selection to get the best use of our limited resources.

The problem of adequate evaluation is present in most of the reports of current reading-improvement programs. There is little careful attempt to spell out objectives and to relate evaluation techniques to these objectives. As we noted earlier, these programs offered a wide diversity of goals, yet they all employed a simple test or two of reading skills to evaluate their results. For example, how does a reading test measure success in the goals of improved study techniques or increased voluntary reading, the two most frequently mentioned aims in these programs? Or, how does a reading test reflect successful teaching of library skills, oral communication, concentration, or most of the other objectives? As Barbe[2] has pointed out, failure to relate evaluation techniques to the goals of the program is a common failing. There is a great need here for more intelligent use of critical, comparative observation, and improved records, not to mention self-evaluation charts and other subjective measures of progress.

In these programs, evaluative techniques are not only often unrelated to the objectives, but the interpretation of the reading test results is also often faulty. Only two of the programs used control groups to determine whether reading gains were real or due to maturation or other factors. Two programs report reading test results in terms of the average gain in percentiles as though percentiles at various points on the scale were equivalent. None of the programs recognized that there is a tendency for poor readers to regress toward the mean regardless of the effectiveness of the training program. Time does not permit more than a passing comment on the inappropriate statistical procedures present in many of these reports. As in other aspects of evaluation, there is evidence here of lack of careful planning and of training.

**Specific Suggestions.** Most of our comments on the reading programs that we reviewed have been critical. However, these programs do offer many valuable and useful suggestions. For example, in promoting voluntary reading, they found four important elements: 1) allow class time for free reading; 2) supply many books related to students' interests; 3) try to relate free reading to students' personal problems; and 4) use direct teaching in comparison of good and poor literature and in relating reading to writing. Such lists of books on pupils' problems as those of Bertram[4] and Burton[5] are helpful in these efforts.

Motivation and active interest on the part of students is an essential to success. This axiom is reflected in the results of the only unsuccessful program in the group, that of Scully. He observed:

> While commitments were made by parents in behalf of their children, absence and tardiness did prove disconcerting inasmuch as pupils had indifferent attitudes about attending as well as mixed feelings about their own need for reading help . . . " (p 119.)

Students did not like activities involving listening for main ideas, or using reference skills in artificial situations. Boys particularly did not enjoy keeping vocabulary notebooks, studying types of literature or taking notes on talks. Girls, on the other hand, enjoyed keeping a record of the books they read.[6]

Mills' study indicates that integrated instruction in reading and writing results in better themes and better observation of mechanics and grammar than does simple instruction in grammar.[16]

Strang's study implies that direct instruction is essential for each type of skill desired.[24] Such skills as appreciation, critical reading or extensive reading do not emerge as by-products of training in general skills.[21]

Alm[1] stresses the need for creating a favorable atmosphere for reading. He emphasizes the importance of displays, teacher attitude and an ample supply of books. In relating pupils' needs and abilities to instruction, he recommends greater use of test results, cumulative reading records, the reteaching of skills taught in earlier schooling, and a careful analysis of the reading demands of the classroom. In developing interests, Alm suggests that students keep a 24-hour diary of their uses of reading, and that reading be related to their future careers by such techniques as interviews with graduates, analysis of job descriptions and the like.

Niles and Early[17] stress 13 reasons for or uses of reading that should be emphasized to students to help them recognize their own needs more clearly.

In the area of vocabulary, there are a number of specific suggestions offered in recent articles. McCullough,[14] for example, reminds us that we must be certain that words are in the students' speaking vocabularies before we can expect their recognition as sight words. She also suggests that teachers must vitalize word study by extending the familiarity of students with new terms by discussions and actual use of these words in speaking and writing. Miles[16] feels that vocabulary words should be presented in syllables, pronouncing while writing on the blackboard, rather than presenting words already written on the board. Alm[1] decries the common attempt to learn a set number of words per day, preferring that words be learned as a result of wide reading, and by the use of the knowledge of word parts in analyzing new words as they are encountered.

In the area of rate of reading, Grayum[10] finds that skimming is not well developed among most readers. Alm[1] points out the necessity for helping students to recognize that elements influencing rate include familiarity of the materials, the time available, the reasons for reading, and the difficulty of the material.

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# Experimental Bases of the Psychology of Reading

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Most of us, reading specialists as well as classroom teachers, are much more interested in the practical problems of developmental and remedial reading than we are in the experimentally derived bases for these applications.

Although it is true that in our applications we often must make decisions for which there is no direct experimentally derived basis, we do not make wise applications in a vacuum. It is worthwhile, now and then at least, to consider those data upon which we must depend for sound applications.

"Horse sense" is a necessary attribute of the excellent teacher, but professionalism must have a solid basis in scientific knowledge. There are many parallels between the applications that we make and the applications that members of other professions must make. All of us frequently must venture from the known into the unknown. Even the physician and the engineer constantly must make their practical application. But if we are to be even reasonably safe, our practical applications must have a firm scientific basis. Each of us must know what it is possible to know before he can venture safely into the unknown. All matters of judgment, all practices of the healing, building, and educational arts, must be anchored in the sciences. The physician anchors his arts in biology, anatomy and chemistry; the engineer anchors his art in mathematics and physics. The reading specialist must anchor his art in his sciences—psychology, educational psychology, and experimental education.

Our purpose here is to examine those scientifically derived bases upon which the art of teaching reading rests. We are concerned with what the psychological and classroom laboratories have contributed, since these contributions must form the basis for our educational methodology, materials, curriculum, and philosophy, as well as for our administrative practice.

For the past year, Mr. Emerald Dechant and I have been attempting to collate and synthesize those experimental data that are the basis for a psychology of reading. Research in the area of reading has become so great that most reviews have become time-delimited, annual slices. In our synthesization we are attempting to create an integrated body of knowledge from the accumulated research and theory. In doing so we have delved into clinical, experimental, and general psychology, biology, physiology, and neurology as well as the vast literature of educational psychology.

A few years ago, Betts suggested that in order to identify valid conclusions and implications there was a need for carefully considered critiques, rather than mere summarizing of research. With this in mind we are engaged in a project that goes beyond merely organizing the data on reading. Although this paper is entitled "The Experimental Bases of Reading," a summary of the research is merely our first and not our only consideration. We hope to identify the general principles involved in reading and to locate those areas where knowledge is still incomplete and more information is needed. Thus the principles that we are attempting to identify may well be the more important phase of this study.

The emphasis of our study is on synthesis rather than on analysis, on interpretation and evaluation rather than on measurement. It is a secondary rather than a primary investigation. We wish to chart past progress and to open the path to more fruitful analytical studies.

The study rests on a number of assumptions. First, we believe that research has advanced to the point where identification of fundamental principles of reading is a more pressing need than is the need for an additional specific and original analytical study. Secondly, we believe that reading research may profit from some redirection. There may be numerous questions that have not yet been put to experimental or pragmatic test. Thirdly, we believe that up to now there has been no integraiton of the general principles of educational psychology and particularly of basic learning theory with the data that have been obtained concerning the reading process.

Our first task was to identify and to define the limits of the study. We inspected the major summaries of the research. We relied heavily on the summaries of Traxler and Gray. The summaries of research in the Journal of Educational Research and in the Review of Educational Research were particularly valuable. We also referred to textbooks devoted to the psychology and methodology of reading. This literature helped us to establish the specific content areas of educational interest. The considered judgment of educators became a criterion for our choice of topics.

We identified 11 areas that were of mutual interest to the educators and psychologists. Unless the data had both educational significance and a psychological basis, it did not meet our criteria and was excluded from the study. Obviously, our categories are not mutually exclusive.

The eleven broad areas that we identified are:

1. The Perceptual Nature of the Reading Process
2. Learning Theory and the Reading Process
3. The Psychological Bases of Readiness
4. The Physiological Bases of Reading
5. The Basic Skills in Reading
6. Motivation and Reading Interests
7. Readability and Legibility Factors in Reading
8. Personal Development and the Reading Process
9. Reading as a Learning Process
10. The Developmental Nature of Reading
11. The Psychological Bases of Diagnosis and Remediation

Actually we may have failed to identify all the areas of knowledge that are basic to an understanding of the reading process. We know that we are likely to leave many subtopics inadequately covered. So far we have examined more than 2,000 studies that seem important to our project. No doubt there is much that is worthwhile that we have not considered and must leave unconsidered. Our personal inabilities and biases may well have led us to important errors and omissions. But we do hope that our project has established a framework onto which others may build and which others may modify.

The synthesis of the research has been in itself a major work, but the deduction of sound principles and conclusions and the identification of the areas of uncertainty present the greater challenge. In science a far greater number of men devote their time to an observation of the facts than to the problems of explanation. Our study is directed primarily toward explanation.

Modern science has two components: the empirical and the theoretical. The empirical element is concerned with observation; the theoretical element is concerned with interpretation and explanation of observation. A scientific system is a hierarchy of interrelated principles derived from a set of basic postulates. Science starts with a postulate and then makes one or more deductions that it proceeds to test. If the deduction disagrees with observed data, the postulate must either be abandoned or modified to encompass the data.

Postulates guide the direction of science, and may lead to a large number of deductions. Postulates do not establish the validity of the deductions; in science the validity of postulates is established through the soundness of its deductions.

Postulates are not always based on experimental data. They may be prompted by an educated guess. In reading, certainly, postulates are not always research oriented; many are the result of educational practice. They often represent the thoughtful judgment of educators. A postulate must yield if and when it conflicts with observed data. Postulates are not absolute truth; in fact, science recognizes no absolute truth. Theoretical truths, as expressed in postulates, are more or less probable.

Our study has suggestde a number of basic postulates about reading. Undoubtedly, we have not established a final framework of postulates. We hope we have made a beginning. From our postulates we have deduced a much greater number of first and second order principles. Some of these principles were suggested by the conclusions of educators; others, and perhaps the greater number, are based on research studies.

Each principle that we suggest should be a logical derivation from a postulate; second order principles should flow logically from first order principles. It is this hierarchy that builds a scientific system. Research in the future must test each principle. If observation does not agree with the principle, the principle is either an illogical deduction or the postulate must be altered to encompass the research findings.

With this Hullian frame of reference we hope we have made a beginning in systematizing our knowledge about reading. Although our data are incomplete at this time and suffer from many inadequacies, we feel that the aims of this study can be brought into better focus if we explore with you the direction that our study is taking.

The first content-area that we investigated is entitled: "The Perceptual Nature of the Reading Process." Two postulates were suggested in this area: First, that reading is a perceptual process; secondly, that reading is a basic form of communication. In this report we wish to explore with you the evolution of but one postulate. It has suggested a number of first and second order principles. Lack of space permits us to discuss only some of these.

## Postulates and Basic Principles

I. **Postulate I: Reading is a perceptual process.**

A. First Order Principle I:

Reading involves a passive and an active phase. The passive phase consists of the environmental conditions, especially the physiological stimulus. This stimulus is the word or a collection of words. (In remaining principles the stimulus is identified as a "word" even though it may be a collection of words.) The active phase is the development or creative construction of meaning that occurs in response to the external stimuli. A symbol may suggest both concrete and abstract meanings.

(In the second order principles that follow the emphasis is on the active phase.)

### Second Order Principles

1. A word is a purely arbitrary symbol possessing no meaning of itself; a symbol suggests meaning.
2. Perception of a symbol is characterized more by meaning than by recognition.
3. All perception involves some conception.
4. The greater the number of concepts that the reader has fixed through words, the better will be his understanding of what he reads.

   (Comprehension or the apprehension of meaning is a direct function of (1) the number of words the person knows and (2) the number of meanings that he associates with each word.)
5. The more specific the reaction to printed words, the less effective is the communication between the writer and the reader.

6. The more abstract the reaction to printed words, the more effective is the communication between the writer and the reader.
7. The more abstract the reaction to printed words, the greater is the understanding of what is read.
8. Differences in abstracting ability or in the ability to think in categories differentiate the good reader from the poor reader.
9. The greater the concept loading of words, the more difficult it is to understand them.

   (It may be unwise to teach systematic history before the child has a concept of time; to teach mathematics before the child has a concept of numbers.)

B. First Order Principle II:
Perception of a word is never completely veridical: verbal symbols at best are inadequate substitutes for direct experience.

**Second Order Principles**

1. The validity of the reader's perception is its predictive value in action.

   (The meaning of tractor that may be aroused by the word caterpillar, may be adequate in one response situation; in another situation such a response to the word would not be validated in action. The word might then suggest the concept, larva. Concept-environment concordance is not completely possible.)
2. The reliability of the reader's perception is determined by the consequences to which his perception leads.

   (If the reader's response to a word is consistently congruent with the context, for example, then his perception is reliable.)
3. Reliability of perception of a word is a decreasing function of the number of meanings that are associated with the word.
   (A six-year-old child's perception of a word tends to be more reliable if the printed word suggests only one meaning if it can suggest ten different meanings.)

4. Perceptual veridicality is a function of experience.
   (The fact that the poor reader substitutes words that do not fit contextually is explainable by his lack of experiences necessary for veridicality. The reader preceives whatever represents for him the most likely prognosis for action based upon his experience. The good reader's prognosis is better than that of the poor reader.)

C. First Order Principle III:
Reaction to a word is organismic; it is a function of the person's innate endowment, of the quality and number of his prior experiences, of the reconstruction of the experiences, the organization of experience, the culture, and the context in which the word occurs.

**Second Order Principles**

1. Reaction to a word is a function of mental age.
   (Research has indicated that concepts of size, roundness, and triangularity usually develop by age three. Form perception develops rapidly between the ages of four and seven. The concept of systematic time does not develop much before ages 11 or 12. Concepts of latitude, sphericity, and longitude develop generally between the ages of 12 and 13. Concepts of cause and effect develop generally at the age of 14 or 15.)
2. The development of facility in conceptualization is a function of previous experience in concept formation.
   (The progression in concept formation is from the simple to the complex; from diffuse to differentiated; from egocentric to objective; from concrete to abstract; and from inconsistent to consistent.)
3. Other things being equal, the younger the child, the more concrete is his perception.
4. Reaction to the word is a function of the number of experiences.
   (Words may suggest multiple meanings. The number of meanings actually suggested depends on the number of experiences the reader has associated with the word.)

5. The number of different meanings of a word is related positively to the frequency of word usage.
6. Meaning is a function of context. Words elicit different meanings, depending on the context in which they occur.
7. Perception of new words and recognition of words that have been seen before are significantly easier when these words are accompanied by familiar rather than unfamiliar words. Syntax, for example, suggests the meaning of certain words, such as "for", "because," etc.
8. Reaction to a word is a more direct function of experience than of context.
9. Reaction to the word is a function of the individual's emotional make-up.

   (All perceptions involve an emotional and affective element. The words, Negro, Communist, Catholic, Jew, Democrat, or Republican may evoke some common meaning from a number of people, but may also evoke a unique meaning from each. The chances are that this unique meaning is on a concrete level.)

Since the principles that we are suggesting are derived directly from experimental data and the considered conclusions of others, it will be necesesary to include numerous footnote credits for each of them in our final publication. This is not done here because this paper is merely a preliminary report and publication space is necessarily limited.

Obviously, we are trying to proceed in the psychology of reading somewhat as Clark Hull proceeded in attempting to define the area of human learning. The system is Hullian in orientation. We are interested in prediction of behavior. There is, however, one big difference. The unit of behavior is not the experimentally controlled unit of the psychological laboratory. In this sense we are closer to Lewin than to Hull. are testable. The ultimate criterion of a principle is its testability.

Perhaps we have not succeeded in stating each principle so it is related to the least number of antecedent conditions. Nor will it be possible to test each deduction mathematically. However each must be subject to experimental verification. Our postulates, we hope, are broad enough to lead to deductions that go beyond present research. We hope that we have produced a rough first draft in which others will help us find the errors, and which others as well as ourselves may polish, add to, and finally succeed in developing as a sound foundation for both further research and considered application. Our set of postulates is very tentative. It is certainly not all inclusive, but we take consolation in the fact that even Hull reserved the right to change his system before his daily breakfast.

We realize that we are directing our efforts primarily at the psychology of reading, but we have not entirely ignored practical considerations. In our discussion of the research, we are seeking educational applications. Our published work should attempt to evaluate and discuss the educational implications of our principles.

# A Reading Versatility Inventory

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One of the most important characteristics of the good reader is flexibility. He changes his reading speed and approach to suit his purpose for reading. He varies his rate and method of reading to accommodate differences in style of writing, level of difficulty in content, and amount and quality of his background knowledge of the subject. This ability to change one's reading rate, to vary the thoroughness and fullness of comprehension achieved by reading, and to alter the character of one's reading approach, is the basis upon which depend the ability to read selectively and critically, to evaluate and judge what has been read. Many reading specialists have recognized the importance of flexibility in reading.* Some have devised techniques and diagnostic instruments to assess it[2] [3].

In order to improve their reading competence, students need to see evidence of any weaknesses which may exist in this important aspect of reading. They can benefit from experience with a diagnostic instrument which offers them selections differing in diffulculty of style, in difficulty of content, and in purpose set for reading. Students should see evidence of the extent to which they actually do vary their reading to take account of these factors. Teachers of developmental reading programs should have quick and reliable means of finding readers who are inflexible and who lack versatility.

An instrument for this purpose has been developed at Marquette University. It has been designated an Inventory of Reading Versatility[1]. It is intended for use with superior high school seniors, college students, and adults with high school education or more who are capable of reading material of more than average difficulty.

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*According to Traxler: Research indicates that mature readers learn to adjust their rate according to the difficulty of the material and their familiarity with it, and that the better readers adjust more readily than the poorer ones do. There is also evidence that in certain fields, such as science and mathematics, the pupils who have learned to read slowly and carefully are higher achievers than the fast readers. It seems likely that all pupils would be greatly benefited if they were taught early in their school career to vary their reading speed according to the nature and difficulty of the material and according to their purposes in reading different kinds of material[4].

This inventory consists of three reading selections, each of which requires a different reading approach. The student is set a different purpose for reading each selection. He is asked to read in accord with that stated purpose. It is recognized, of course, that students may modify the stated purpose, consciously or unconsciously, in accord with their individual needs. Modification in the wrong direction, however, will result in the choice of an inappropriate reading approach. The three specific purposes stated in the directions direct the reader to read one section carefully and thoroughly, one section rapidly, and to skim (scan) one section. It has been empirically determined that a flexible reader will read each succeeding section of the Inventory 1.8 to 2 times faster than the preceding one. In contrast, the inflexible reader will tend to have a nearly uniform rate throughout. This is in agreement with the findings of Sheldon and Spache.[2] [3]

The reading of each section is timed. The amount-time method is used. Students are allowed to finish the whole reading selection. A number of multiple-choice questions follow sections 1 and 2 of the Inventory. These questions require answers as stated in the directions preceding these sections. Rate of reading is computed in words per minute.

General directions to the student for the Inventory are:

> This inventory is designed to measure your ability to read in accordance with a set purpose. Each of the three reading selections demands a different speed and type of reading. You are told at the beginning of each reading selection the kind of comprehension for which you should strive. The directions define the purpose for which you should read the selection.

The Inventory consists of three reading selections adapted from different sources. The first selection is an adaptation concerning judicial power from De Tocqueville's Democracy in America. This selection is approximately 1000 words in length. Its readability level is difficult (Flesch score of 45). For this selection the student's purpose for reading is given as follows:

> Your purpose for reading is to determine the author's views of the nature and characteristics of judicial power in the United States. Adjust your rate of reading so that your comprehension will be at a maximum.

> You will be questioned on the arguments, supporting statements, important details, and inferences which can logically be drawn from this passage. Read carefully to achieve this purpose. In answering the questions, do not refer to the article.

The second section of the Inventory is a selection of general fiction. (This is an adaptation of one of Ambrose Bierce's stories.) Also approximately 1000 words in length, its readability level is fairly easy (Flesch score of 72). For this selection the student is given directions as follows:

> Your purpose is to read as rapidly as you can and still grasp the main points of the story. Read only once. In answering the questions do not refer to the story. The questions will test your comprehension of the main events of the story.

The third section is an exercise in skimming to find answers to three specific questions. Directions given to the student for this section are as follows:

> Skim the passage for answers to the following questions. You are interested only in finding answers to these questions. As soon as you find an answer to any one of the questions, turn to the end of the article and quickly encircle the correct alternative for that question. Then return to the place you left off and continue skimming for the answers to the remaining questions. Read all the questions carefully and be sure you know what each question asks before you start skimming.

Before timing is begun on the skimming section, students are given time to read the questions to be answered. The three questions which form part of this section are stated at the beginning and repeated at the end of the text. These questions require specific information. An example is: "What was the number reported as unemployed in January?" The questions are multiple-choice type. Timing covers the entire period from the beginning of skimming until the completion of answering the questions.

After finishing the Inventory, the speed for each section is computed in words per minute. Comprehension is computed in percentage of correct answers to the questions. The ratio of the student's rate between the sections (that is, ratio of speed for section 2 to the speed for section 1, etc.) is then determined.

Empirical studies with various samples from different populations representative of those for which the Inventory was designed indicate that readers identified by other means as "good" readers have a very flexible reading approach as measured by this Inventory. Results of our studies suggest that the ratios fall into three categories as follows:

| | |
|---|---|
| below 1.4 | poor flexibility |
| 1.4-1.75 | average flexibility |
| 1.75 up | excellent flexibility |

The results of the Reading Versatility Inventory indicate how flexible the student is in his reading. These results also show the rates at which he read the various selections. The individual reading rates indicate the speed at which the person read the selections, the comprehensive scores show the degree to which he achieved his reading purpose, and the reading ratios show the degree of reading flexibility achieved.

The trained, skillful reader will read Section 2 (general fiction) about twice as fast as he read Section 1. Not only is the text of Section 2 much easier but his purpose for reading is considerably different. Likewise, he will skim Section 3 at about twice the rate at which he read Section 2. These appropriate rates will be accompanied by satisfactory comprehension scores.

In general, the higher the ratio between the sections, the better the flexibility of the reader. This, of course, is in agreement with what has been said before about flexibility. If a person reads Section 2 twice as fast as he reads Section 1, he is varying his rate to fit the material and purpose much better than if he reads both sections at approximately the same speed. Typical results made by such a "good" reader might be:

| | | | |
|---|---|---|---|
| Section 1 | 250 WPM | Comprehension Score | 87% |
| Section 2 | 500 WPM | Comprehension Score | 75% |
| Section 3 | 950 WPM | Comprehension Score | 100% |

### Reading Ratios

| | |
|---|---|
| Ratio of Section 2 to Section 1 | 2.0 |
| Ratio of Section 3 to Section 2 | 1.9 |
| Ratio of Section 3 to Section 1 | 3.8 |

An inflexible reader, in contrast, would have almost uniform reading speeds for all sections.

In considering the Inventory results, reading rates for the individual sections must be taken into account also. For instance, consider the following results made by a reader:

| | | | | |
|---|---|---|---|---|
| Sec. 1 | 100 WPM | Comp. 100% | Ratio of 2 to 1 | 2.1 |
| Sec. 2 | 210 WPM | Comp. 100% | Ratio of 3 to 2 | 2.0 |
| Sec. 3 | 425 WPM | Comp. 100% | Ratio of 3 to 1 | 4.25 |

These inventory ratios seem to indicate excellent flexibility in reading the different selections. But the rates of reading are too low. This reader is plodding at a snail's pace. Although he does a good job of varying his reading to suit different purposes and types of reading material, he has a basic reading rate which is entirely too low. Therefore, flexibility, while much more important than the attaining of any particular rate, must be considered together with rate in evaluating the performance of a student. In this connection, note the results made by another reader:

| | | | | |
|---|---|---|---|---|
| Sec. 1 | 370 WPM | Comp. 75% | Ratio of 2 to 1 | 1.0 |
| Sec. 2 | 385 WPM | Comp. 75% | Ratio of 3 to 2 | 1.0 |
| Sec. 3 | 390 WPM | Comp. 100% | Ratio of 3 to 1 | 1.0 |

In addition, both flexibility and rate must be considered in conjunction with the comprehension scores. Comprehension is defined here as the ability of the student to get meaning from the various types of material included in the Inventory. The questions upon which these scores are based, function to keep rate within normal bounds by emphasizing the necessity for comprehending what is read. The nature of the questions vary with the purpose which was set for reading each selection. In Section 1, the questions require the understanding of central thoughts, supporting statements, important details, and the drawing of inferences. For Section 2, the questions refer to the main events of the story. In Section 3, the questions can be answered by specific items of information.

Two forms of the Inventory have been developed. Corresponding sections have been taken from the same authors and have been adapted so that readability level is equivalent. The corresponding reading selections of the two forms deal with similar subject matter. The second form (Form B) has slightly longer selections (1400 words) to compensate for practice effect. Studies on samples representative of populations for which the inventory is designed give correlations with a median of .85 (rho) for the two forms in regard to ratio, rate, and comprehension.

Rank order correlation of rates on Section 2 with the rate and comprehension results of the Survey Section (Forms A and B) of the Diagnostic Reading Test yield relatively high correlations (ranging from .75 to .85 rho) for the various samples. Other studies have been conducted.

The authors are currently working on the development of a Reading Versatility Inventory for high school level.

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# The Neurophysiology of Reading Disability

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**The Problem.** Reading clinicians are aware that faulty teaching methods per se are not the cause of reading failure: too many remedial cases fail to respond to intensive instruction. Nor is neuroticism the cause, nor the broken home, nor parental demand for achievement, nor "mixed dominance." For every diagnosis of this sort, we find ten with the same condition who read normally.

The search for a cause has turned repeatedly to neurological functioning but without reward. Hinshelwood and Orton[5] made early attempts; several investigators[4, 6] have tried more recently. Generally the search has been for evidence of structural damage to the brain as aphasics show. Seldom is any damage found. Perhaps the problem is not faulty structure at all. Perhaps it is faulty function.

The theory and treatments to be described below began with that assumption and with a search for a neural mechanism to account for certain symptoms of reading disability. Those symptoms are 1) inability to blend phonemes and 2) extremely slow rate of reading of material consisting of known words.

**Synaptic Transmission.** In 1934[1], Sir Henry Dale proposed a theory that transmission of nerve impulses from one neuron to adjacent ones, requiring the crossing of a gap at the synaptic junction, occurs by chemical means. Briefly, a transmitter, Acetylcholine (Ach), is released through the cell membrane as the membrane depolarizes. The Ach crosses the junction and causes the next neuron to fire, i.e., causes the depolarization process to begin in that neuron. Repetitive firing over the same junction or circuit occurs until the circuit is broken. The circuit-breaker is another chemical, cholinesterase (Che), which reduces Ach to its component parts, acetic acid and choline, thus reducing its effectiveness as a transmitter.

Dale's theory has caused considerable controversy for many years. This year, the last major opponent capitulated[2]. There is little doubt that the mechanism exists.

If we assume an overproduction of Ach, the result should be repetitive firing over the same circuit and slow circuit-breaking. At the perceptual level, we should find inability to move one's focus of attention rapidly, i.e., slow perception and a slow rate of reading. Furthermore, by the time the locus of attention changes, i.e., the circuit is broken and another circuit aroused, the first network may be refractory, i.e., reverberatory activity in that circuit has ceased. In order to blend two phonemes, for instance, fir--st, both must be active simultaneously. Thus, a deficiency in Che or overproduction of Ach may lead to a blending problem.

On the other side of the coin, we find the problem in reverse. Too much Che (or too little Ach) leads to rapid circuit-breaking and fast, inaccurate perception, i.e., the context reader and certain related problems.

**Control of Synaptic Transmission.** Control of transmission seems to be largely a function of available Ach and Che. At this point, speculation ends and research begins. Incidental evidence in the pharmacological literature suggests the locus of control to be in the endocrine system. Furthermore, observation of the characteristics of seriously retarded readers reveals manifestations of sub-clinical endocrine problems.

**The Field Study.** A study was designed to isolate such problems. Subjects were 700 children in grades 3 through 9 in the Ann Arbor public schools. The entire population of children with reading test scores below the 20th percentile were chosen. In addition, 30 superior readers were included. A battery of fifteen individual tests yielding eighteen scores was given by some forty psychometricians. Teams of fifteen examiners visited schools and tested fifteen children at one time. The battery required about 75 minutes. The entire group was tested over a six week period during November and December, 1956.

Score distributions at six month age intervals were converted to standard scores with normalized distributions, thus providing norms based upon a remedial population. It was possible, therefore, to determine a profile of scores for each subject to show his strengths and weaknesses relative to each other on the functions tapped by the following tests:

V—Verbal intelligence: Stanford Binet Vocabulary
M—Performance intelligence: WISC Maze
F—Verbal fluency: Stanford Binet Fluency
K—Visual memory: Knox Cube (Arthur Point Scale)
D—Aural memory: WISC Digit Span

A—Aural discrimination: (Experimental test: Dr. Harlan Bloomer, Director of the Speech Clinic, University of Michigan)
I—Perceptual speed: Thurstone Identical Forms
Ia—Perceptual accuracy: (determined from I)
Co—Immediate memory: WISC Coding (digit-symbol)
G—Gestalt functioning: Street Gestalt (Thurstone)
N—Visual alternation: Necker Cube
Cf—Neural sensitivity: Critical Flicker Fusion Frequency
L—Lateral imbalance (exo- and eso-phoria): Keystone Telebinocular
Va—Visual acuity. Keystone Telebinocular
Ha—Hearing acuity: Individual Audiometric
SA—Extraversion-introversion: SA-S Junior Scales
S—Anxiety-stability: SA-S Junior Scales
Sp—Spelling: Ann Arbor Spelling Scale

It will be noted that several levels of functioning are tapped: cognitive, cognitive-perceptual, perceptual, preceptual-metabolic (N and Cf), sensory, personality and skill.

A representative profile is reproduced below:

**Psychological Test Battery**

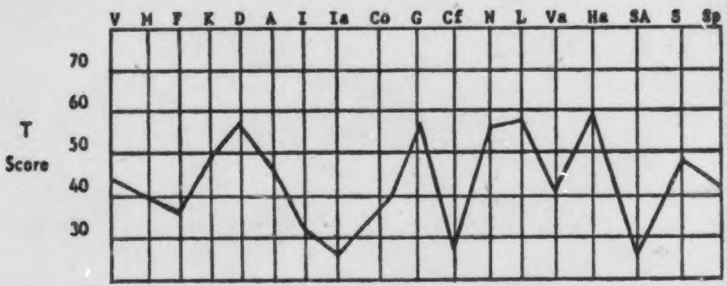

Figure 1. PTB Profile of David F.

This is the psychological test picture of a ten year old non-reader diagnosed medically as post-encephalitic brain damaged. Unusually low scores, two or more differentials below the mean, are those on I, Ia, Cf and SA (extreme introvert). Note the high G, Gestalt functioning, exactly the reverse of what is expected of brain-damaged adults. Immediate memory (Co) is also low.

**Analysis of Data.** The lowest ten percent of the elementary group, forty children, was selected for intensive study. Their profiles were intercorrelated providing a matrix of 780 coefficients. A cluster analysis provided five relatively distinct groups having mean test profiles which led to the theoretical model reproduced below.

The model was based upon the psychological test scores. Further definition of the groups was possible after the children had received extensive medical examination. Group I, defined as hypometabolic, is 1.2 differential above the population norm in weight and .8 differential below the norm in height. Group II, definde as alexia, is 9 months below the norm in skeletal age (carpal X-rays). All group II subjects are boys. Two were found to have undescended testes.

The model is two dimensional. Groups I and IV tend to be extraverted while III and V tend toward introversion. No other scores differentiate the two sides of the model. Groups IV and V appear to have high levels of either Che (IV) or Ach (V) while I and III seem to be low in Che (I) or Ach (III). Group II seems to be low in both.

Group VI was an after thought. The reasoning is as follows: group I is slow and placid while III is hyperactive; II is well-balanced at a low level of functioning; V is slow and placid while IV is hpyeractive, both at a high level of function; thus there must be a balanced group at a high functioning level, obviously the superior reader. If so, the group profile should be a mirror image of that of Group II. The two profiles are reproduced below.

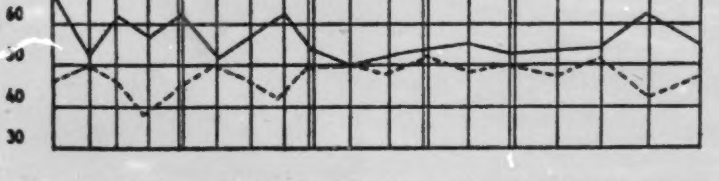

Figure 2. Profiles of the Ach/Che balanced groups at high and low concentration levels. Upper line: superior readers; lower line: alexiacs. Differences in V, F, K, D, I, Co, Sp and Ia all significant beyond .01.

With the exception of K, the prediction is confirmed. An unusually high K score is typical of group V and tends to accompany low verbal intelligence for these extreme subjects.

**Treatment Studies.** Two medication studies have been completed and are reported elsewhere.[8] Briefly, the use of medication designed as a specific for hypometabolism had significant positive effects on the behavior and test scores of groups I, II and III. Changes significantly greater than those of appropriate placebo controls occurred in Co, N, Ia, F, G and L. In general, group I became more active and verbal while group III became more placid. Medication had no observable effect on group V while group IV's test behavior was adversely affected as might be expected.

**Conclusions.** We have been able to cover only a part of the year's study of reading disability. The following conclusions are based upon the total study:

1. Severe reading disability which resists correction is primarily a functional rather than a structural problem. It is most likely caused by abnormal synaptic transmission in certain non-readers and by a failure to achieve adequate long term (reverberatory) activity of neural systems in others.

2. Synaptic transmission and neural activity generally seem to be profoundly influenced by endocrine functioning such that therapy at the glandular level seems indicated.

3. Failure to achieve normally in reading despite instruction is, by and large, a physical problem rather than an instructional one. The finger-pointing of recent years, usually aimed at the public schools, is largely unjustified.

4. Reading disability is a medical problem. It is seldom recognized as "illness" because it's victims appear relatively normal. But the reading problem, the "sub-clinical" case, is at least as severe as a bone fracture and usually more so. The anxiety and, oftentimes, grief generated by school failure is such that it must be recognized by physicians.

Such dead-end diagnoses as "he isn't trying," "he needs more discipline," "he's a neurotic, see a psychiatrist," "too much pressure from his parents," "he'll grow out of it," "poor stock: what can you expect?" and, most commonly, "the trouble is, the schools don't teach phonics anymore," such psuedo-diagnoses, such conscience-balms must be replaced with a clinical diagnosis.

Such diagnosis must be based, for the present, on reading symptoms, on psychological test behavior and on extensive clinical study. Research advances should, in time, reduce the importance to diagnosis of the first and second kinds of information. At that time, reading symptoms and test behavior may be used as evidence that a child needs referral to a physician for treatment of the cause of reading disability.

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# Structuralism: Some Possible Implications

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Participants in this conference have come largely from departments of psychology, from the schools of education, from student personnel services, and from industry. The fact that people from so many different fields have been brought together suggests that reading on the college level has to do with many areas of the educational enterprise. I want to suggest that one area from which a contribution may be looked for is linguistic science.

Structuralism is the newest thing in linguistic science, and I want to say in advance that in relating it to the reading process I am giving a broad interpretation to the term. Such a broad interpretation will perhaps minimize the special problems with which the structural linguists are especially concerning themselves, but it will also, I think, lengthen the perspectives to take in more of the problems with which we ourselves are specially concerned in the promotion of more efficient reading.

The new structural approach to linguistics represents a sharp break with tradition. The accumulated lore of language over the centuries has been based on the literature and grammar of Latin and Greek, which were accepted as a norm of correctness, and therefore were called the classical languages. The field of inquiry was broadened enormously when nearly two hundred years ago British scholars in India discovered that Sanskrit had a grammar and a sound system analogous to these classical languages, and when it was further discovered that still other ancient languages, ranging from Old Persian to Celtic, were part of one related Indo-European family of languages. When in 1822 the philologist Jacob Grimm systematically set forth the correspondence of sounds in several related languages, he laid the foundation upon which, in the century to follow, scholars built a most imposing structure of comparative linguistics. However, this edifice of learning was accommodated only to the Indo-European family of languages. A vast array of little-known tongues indigenous to Asia, Africa, and the Americas remained outside the field of inquiry, and these were conveniently classified, and dismissed, as the "exotic" languages.

Imposing though the achievements of the linguists were by the beginning of the twentieth century, their limitations became apparent as the world community became more closely tied together through trade and cultural interchange. Missionaries, for instance, found that the grammatical structure of the classical languages helped them not at all when they tried to learn such a language as Chinese, which ignores even singular and plural unless number is actually relevant to the idea being expressed. When during the Second World War the United States government undertook to train a corps of linguists, the academic world was brought face to face with the difficult truth that for practical purposes a knowledge of a native African or Asian dialect might be more useful than a knowledge of the revered classical languages. Some teachers of language reacted in much the same way as teachers of college English react when they are asked to think of reading on the college level primarily as a communications skill, apart from what has traditionally been regarded as the necessary humanistic content of an English course.

The sidestepping of tradition in the World War II linguistics program cleared the way for certain new viewpoints that had quietly been gaining acceptance. In a book entitled "Language," published in 1921, Edward Sapir had approached his subject with such detached objectivity that in a chapter on "Types of Linguistic Structure" he impartially ranked Eskimo, Algonquin, and Latin together in a single sentence, and in that order, to illustrate his point. A somewhat larger book, also entitled "Language," published in 1933 by Leonard Bloomfield, is notable because of a vast number of illustrations drawn from what an earlier generation of linguists had called the "exotic" languages.

The classical languages being thus quietly removed from a hitherto unquestioned pre-eminence, the way was opened for the employment, also in academic circles, of more direct methods. When tradition-bound complexities of grammar gave way to an objective study of those structures which were actually operative in the new language to be learned, the processes involved in learning seemed to be greatly simplified. A revolution in the teaching of languages seemed to be in the offing, very much as a revolution in the teaching of reading seemed to be impending when methodologists discovered the word-and-sentence method, which seemed to shortcut the need for phonetic analysis. Some extravagant claims were made concerning the new approaches to language teaching, as for instance in an article in the Reader's Digest magazine for May, 1943, and the merits of the new structural approach are still occasionally the subject of warm discussion in the professional journals.

Application of structural principles to English grammar was made by Professor Charles C. Fries, of the University of Michigan, who, in line with the new orientation, undertook to discover not what English grammar ought to be by traditional standards, but what it is in actuality. He concluded that most of the fine points of grammar insisted on by teachers of English have little validity. This was to be expected, since he insisted, and still insists, that a rule of language is not really valid unless it is based on some form-feature of the language which has actual structural meaning, as distinguished from lexical, or dictionary, meaning. To put the matter in more general terms, the structuralist holds that any feature of the language, to be recognizde as structure, must make a difference in meaning, and that one may not read his own preconceived meanings into the form-features of the language.

This attitude of objectivity has carried over into the newer dictionaries, for example, the American College Dictionary. Instead of being primarily concerned with etymologies and with what a word ought to mean according to its origins, the new lexicography begins with counts of word-frequency and with the most common meanings of present-day usage. Teachers of English in the colleges are as a group not yet fully convinced that actual present-day usage is the adequate criterion of correctness. They are disposed to look with horror on the use of the word "like" as a conjunction, just as, until recently, they looked with horror on the so-called "split infinitive." Given the choice of teaching the language as it actually is and teaching the language as it ought to be, they will prefer what they think ought to be. One might suggest in passing that these traditionalists are also apt to think that there ought to be no problem of reading improvement on the college level, whereas most of you who are attending this conference will probably prefer to approach the language as it actually is, since your techniques generally require you to accept your students as they actually are.

The objective attitude toward things as they actually are is often called the "descriptive" approach, and the word "descriptive," as you know, has a strong connotation of scientific accuracy. The structural linguists have been happy to be called descriptive linguists; thus, a recent discussion of language on structural principles is entitled "An Introduction to Descriptive Linguistics." Still, I believe that an important distinction may be made between the structural approach and the purely descriptive approach.

The system of educational psychology which came to be identified with Edward L. Thorndike and his followers was, I submit, a product of a purely descriptive approach. On the premise that whatever exists at all exists in some amount and can be measured, and on the further premise that the whole is equal to the sum of its component parts, the learning process was analyzed in infinite detail. Job analyses and quantitative measurements based on isolated test elements represented the basic techniques of inquiry, and all questions of "transfer of training" were reduced to a comparison of the common elements of learning. In this atomistic, dissective approach, the total picture, or the total pattern—or the total structure, if you please—was often ignored. Then, sometime in the 1920's, the psychology of "gestalt" was first heard of, the outgrowth of certain experiments in perception which showed, as I recall, that it is not possible to measure any absolute minimum of meaningful sensation, but that in every instance meaning is determined by the total pattern, or "gestalt," of the experience. Then there were Koehler's famous apes, who languished hungrily in a state of non-adaptive behavior under bunches of luscious bananas until with sudden inspiration they seized upon previously irrelevant objects—boxes, sticks, and so on—and reached those bananas. Through some kind of insight, which was certainly more than the mere sum of the parts, those boxes and sticks had come to be resolved into a perceptual pattern, or gestalt, or structure. Here was a factor in learning that clearly went beyond those factors of recency, readiness, and effect which had been regarded as basic ever since William James first talked to teachers on psychology. Recognition of this factor of gestalt, or structure in perception raised a whole series of entertaining optical illusions to the dignity of laboratory material and perhaps helped to make the ink-blot a means for probing the subconscious. By this time teachers of reading had already discovered, largely through empirical processes of trial-and-error, that a meaningful pattern (by way of the word-and-sentence method) was an infinitely quicker and easier means to the perception of words and to the acquisition of reading skills than was the presentation of words in isolation, or worse still, of letters and sounds in isolation.

If the term structure is broadly interpreted, then all meaningful patterns of language, so far as they can be objectively described, are part of the structure of the language. In this sense, John Milton used the structural approach when he devised his "Accidence-Commenc'd Grammar" for his sometimes unappreciative nephews, and in this sense the facts of Jacob Grimm's so-called law constitute a structure, serving to illuminate mazes of detail which formerly seemed unrelated, and consolidating the atoms of experience into a meaningful pattern. But whereas the older grammar often held up a false concept of structure, as when a complete paradigm for a subjunctive mood in English was set up after the pattern of the classical languages, the newer structuralism insists firmly, and even rigidly, that structural features of a language, to be recognized as structure, must have a demonstrable relation to meaning. Structures are not to be defined in terms of preconceived meanings; rather, meaning must be the end-result of structure. To illustrate this concept in terms of the reading process, I recall that as a boy in grade-school I had difficulty with the word "nowhere," which I read as "now-here." Another pupil read the word "earnest" as "ear-nest." Then there was the college freshman who was puzzled by what his chemistry text had to say about "unionized" molecules, when he should have read "un-ionized." It is difficult to define just what structural feature of the language determines that we shall read "nowhere," "earnest," and "un-ionized" instead of "now-here," "ear-nest," and "union-ized." One must conclude that language itself is a complex of patterns or structurse of sounds and words in context, and that these patterns of context, in their infinite number, must become part of the reader's experience if the individual words and sounds are to have any real meaning. We may therefore not read our preconceptions of meaning into the spoken or written symbol, and much less may we expect our pupils to do so. On the simplest level, we will not expect children to distinguish "nowhere" from "now-here" or "earnest" from "ear-nest" until these word-patterns have become part of a general structural concept. In a broader way, we shall not expect our high-school students to apprehend the subleties of the psychological drama if their experiences in reading and listening have been limited to the simple formulas of the cowboy western or the cops-and-robbers television episode. Perhaps our devotion, as teachers of English, to Macbeth and Julius Caesar stems from the magical way in which Shakespeare in these plays bridges external and internal action so that the spectacular is understandably related to inner motivation. (Please excuse me if I have gone out of my way to put in a plug for a reading of the literary classics.)

The structural approach, as distinguished from a purely descriptive approach, is typified by the concept of the phoneme, the phoneme being defined as "the minimum feature of the expression system of a spoken language by which one thing that might have been said is distinguished from any other thing that might have been said." Before the phonemic theory came into general acceptance, the descriptive linguists were occupied with the sort of thing Bernard Shaw's Professor Higgins took such delight in; that is, in fine phonetic differences that would enable one to distinguish perhaps a hundred and thirty different vowels. To illustrate, it is possible to become quite lost in trying to distinguish shades of vowel color in words ending in "og" such as bog, cog, dog, fog, frog, hog, jog, olg, tog, and pollywog. And in analyzing the speech of one particular person, one would only have begun the job, for variations from speaker to speaker are endless. Now, when the structural concept of the phoneme is applied to this matter of sound variation, the problem of making valid distinctions is infinitely simplified, and without a sacrifice of accuracy.

The structuralist asks only whether the variation in sound-color has a bearing on meaning, or to put it another way, whether sound differences represent different phonemes. In general American speech, it makes no difference particularly just what shade of sound color a speaker uses in pronouncing fog, cog, or jog. For the structuralists the variations, or allophones, actually represent the same phoneme. The structural linguist is concerned far less than Professor Higgins about just how my fair lady says "The rain in Spain falls mainly on the plain." For him, sounds have phonemic distinction (apart from phonetic distinction) only when they signal a difference in meaning. In deciding whether or not there are phonemic differences, he looks for minimal pairs—pairs of words, that is, in which the only difference is the one for which a phonemic relationship is to be established.

Thus, although a phonemic difference can not be established between "ah" and "aw" through such words as "jog" (jahg or jawg) and "hog," (hahg or hawg) a phonemic difference for these sounds is established through other minimal pairs, such as hock and hawk or chock and chalk. For the structuralist, the obvious difference in spelling is not immediately relevant, for he will be quick to point out that the real language is spoken, and that all forms of writing are only derivative representations of the spoken language.

An interesting problem of phonemic distinction has to do with the obscure or colorless vowel found in unaccented syllables. In accordance with the plan of distribution of sounds in the International Phonetic Alphabet, it has been generally accepted that there is no necessary distinction between the sounds of a, e, i, and o in the words separate, operate, aspirate, and corporate, and that the unaccented vowel in these words could very well be represented by the smybol of an upside-down e, called "schwa." This symbol has been adopted in the newer dictionaries. A careful listener will, however, discern a slightly different coloring for this unaccented vowel in such words as ticket, minute, and sprocket. Traeger and Smith, whose "Outlines of English Structure," published in 1952, has much authority as a definitive statement of the structuralist position, have maintained that the sound of the unaccented vowel in ticket and minute should be represented by a crossed I. Their contention that there is a phonemic difference between the unaccented vowel in separate and that in ticket is based on experience with languages other than English. If their contention is sustained, then the American College Dictionary is out on a limb. In any event, it will probably be some time before the pronunctiation cues in the dictionaries, keyed as they usually are to the old-fashioned diacritical marks, are brought into line with the more recent theories concerning the sound-structure of the language.

There are forty-six phonemes in English, according to sound doctrine (the pun is for lagniappe). In the Traeger and Smith formulation these forty-six phonemes go beyond the familiar vowels and consonants, to include also stress and juncture. The phonemic value of stress and juncture is illustrated by such minimal pairs of spoken phrases as "Red Cross girls" beside "red, cross, girls"; "light housekeeping" beside "lighthouse keeping"; "greenhouse" beside "green house"; "briefcase" beside "brief case"; "light, gray, stone blocks" beside "light-gray stone blocks," and so on. Careful analysts have professed to distinguish objectively four degrees of stress or loudness and four kinds of pauses or juncture, and an emphasis on these hitherto largely unrecognized phonemes has become a sort of trade-mark of structuralism. There has been lengthy discussion, for instance, concerning the distinguishable stresses in such sentences as "The Pennsylvania Railroad is the main Pennsylvania railroad." The structuralist is not satisfied to clarify by means of punctuation and capitalization what might be ambiguous in the spoken language. Indeed, punctuation has nothing really to do with stress and juncture, but is rather concerned with intonation, that is, with rising and falling tone, as might be illustrated in the sentences "What's that in the road ahead?" beside "What's that in the road? A head?"; and "What is this thing called love?" beside "What! Is this thing called love?"

In connection with reading, particularly on the adult level, we will be concerned especially to know just what there is about the written representation of the spoken language that conveys meaning to the reader, and structural linguistics will do much to demonstrate some of the inadequacies of written representation. More generally, though, the reading process will have to be viewed in perspective as one aspect of the communicative function of language. Among the various problems of reading as a means of communication, one might call to mind the investigations of Dr. Spache regarding the minimal patterns of the printed word which can be recognized as meaningful. Then there have been various attempts to establish indices of readability, usually on the basis of sentence length, complexity of grammatical structure, and difficulty of the vocabulary.

We shall have always with us the problem of word-analysis or phonics as a means to word recognition. On the college level, I would suggest, this matter of word-analysis can profitably be related to some of the concepts that are usually reserved for courses in linguistics. In my own teaching I have tried to approach these more advanced concepts through the patterns or structures which are found in our spelling system. There are, for instance, patterns of historical development which explain why similarly spelled words such bough, dough, cough, and through are pronounced so differently, and why the double-o in food, good, and blood represents such various sounds. If these historical patterns lack the rigid objectivity of the structural doctrine, they are still useful in helping college freshmen to understand the language.

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# Reading Improvement on Television

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One of the significant developments in American education is the increasing attention being given to programs for adults. These programs take many forms. For example, more attention is being given to television as a means of extending educational services to many adults who could not otherwise be reached. Most of these educational programs for adults, if not all of them, depend for their full effectiveness upon reading efficiency in their students.

Dr. Gray has pointed out the very rapid increase in the demands made on readers in recent years by current life. He has also indicated the need to provide opportunities for adults to acquire those attitudes and skills which characterize good readers. As part of its Adult Education program, Marquette University has offered a comprehensive reading-improvement program to adults for several years. We are fully cognizant, of course, that there were many adults who could not take advantage of these services.

Therefore, we were quite receptive to the request made by the Director of Public Affairs of the Milwaukee CBS television station, WXIX-TV, that we consider the feasibility of collaboration in a series of programs dealing with good reading. He explained that the television executives believed that well-informed adults made better viewers. The best way for adults to become better informed, they thought, was through wide and balanced reading. Reading itself, he pointed out, is improved and enhanced by the rich and manifold meanings and experiences gained through television. Nevertheless, an important way to aid viewers in getting more from television would be to help them become more mature readers. Furthermore, such informed adults would be able to make better decisions, lead richer lives, and participate more fully and more wisely in the vital activities of today's world. CBS was interested in collaborating in such a project.

Since Marquette University was interested in extending its educational services to as many of the community as cared to avail themselves of such services, an outline of a proposed series of programs dealing with reading principles was prepared. This outline was prepared with Dr. Gray's principles for adult reading programs in mind[3]; namely that:

1. A uniform adult reading program will not meet needs of adults adequately.
2. A program must be devised to appeal to capable people who have mastered basic skills of reading but who do not have reading patterns in accord with their ability.
3. Any proposed program should also offer help to adults with high-school training who need stimulation to embark on programs of purposeful, worthwhile reading.
4. A program should offer help to adults who can read materials of average difficulty with fair ease and understanding, but who need improvement of their ability to read.
5. Information must be given those who need help in basic reading skills and those who need individual professional help for deficiencies as to where and how such services can be obtained.

These proposals were enthusiastically accepted by the staff of television station WXIX-TV. The station then offered prime Sunday afternoon viewing time for 13 weeks for the series. The resulting program, entitled "The Art of Good Reading," was offered as a joint venture of Marquette University and station WXIX-TV. Adults could enroll for credit or as auditors through the Adult Education Division of the university. Satisfactory completion of the course earned one hour of college credit for those enrolled as credit students.

The course was intended for the reader who had completed high school, had mastered the basic reading skills, and was able to read materials of average difficulty. It aimed to present reading as a 'complex activity of four dimensions: the perception of words, a clear grasp of meaning, thoughtful reaction, and integration."[2] The series presented principles and concepts of effective reading which underlie or contribute to maturity in reading. Emphasis on gadgets or on rate was avoided throughout. Stimulation was provided for further exploration of the subject covered as well as for exploration by the viewers of the riches in the field of reading.

*The Art of Efficient Reading* by Spache and Berg[4] was chosen as the suggested manual for the course because it was in accord with the goals of the series and could be used independently by those viewing the course. This manual also discussed rather carefully the need for evaluating one's reading skills, methods used in such evaluation, and facilities offering these services. In addition, scripts were written to inform viewers of opportunities for this type of evaluation and for individual training at the collegiate institutions in the area.

In order that the viewers might have opportunities to practice the principles and concepts which were presented, special exercises were designed which supplemented those contained in the Spache and Berg manual. These were mailed as a matter of routine to those enrolled for the course and to all not enrolled who requested them.

In his discussion of reading-improvement programs for adults, Dr. Gray had pointed out that such projects must be organized in terms of adult needs and interests and that techniques used should promote maximum amount of effective reading, good thinking, and group participation. He warned that formal methods of teaching are ineffective in adult-reading projects; that informality is essential to effective group activity; that active participation by group members in those activities must be encouraged. He also stressed that the activities must involve purposeful intensive indivdual reading.[3]

At first glance, much of this might seem to be impossible to attain through television (e.g., group participation, active participation, etc.). It has been pointed out, however, by Dale[1] that while TV is chiefly a one-way communication device, this does not mean there can be no interaction between viewer and TV speaker. The speaker can anticipate and answer unspoken questions of the viewer. Furthermore, interests of viewers can be gauged by mailed questions and taken into account in preparation of later programs. It was also realized that television has the impact of immediacy. Being able to show a scene from many points of view, it can take the viewer closer to an event than he would be if he were on the scene. As Dale has observed, TV is intimate and personal, with the potentiality of conveying ideas and information with great impact.

In preparing the syllabus and the scripts for each of the 13 weekly programs, the following questions were kept in mind:[1]

1. Will this be liked? Will it attract attention? Adults "come" voluntarily and can "leave" with no more effort than turning a dial.

2. Is the link between this material and the interests of those for whom it was designed apparent?

3. Can the material used be understood? Is it readable? How can it be best presented—discussion, lecture, visually?

4. Will the program give the viewer a sense of participation or will it encourage passivity?

5. How will interests and needs of viewers be sampled?

6. Does this help the viewers toward deeper penetration of the field and independent work?

It was decided, after consultation with television personnel, that a classroom format would be most likely to achieve the aims set forth above. Actual students in a classroom situation would encourage viewers to identify and would heighten the sense of immediate participation. Furthermore, students could ask the questions most likely to be troubling the viewers (as shown by mail, telephone queries, or past experience in dealing with adults).[1]

Accordingly, 10 students from Marquette University were allowed to enroll for the one-hour credit. These students were juniors and seniors. Certain deviations from ordinary classroom routine had to be made as concessions to the exigencies of putting "the show on the air." For instance, students with questions to ask, or be asked, had to be identified in the script so that the director and cameraman could be sure to have them on camera at the appropriate time. Also, time had to be allocated for answers. Questions which the students were to ask were assigned in advance. Students were then allowed to ask unassigned, spontaneous questions within time limits. Questions which were asked the students were not assigned in advance: the students were merely informed of the order in which questions would be asked and the approximate time allowed for answers. (Since experience taught that such procedure sometimes led to incorrect answers which needed to be corrected, one student, selected for the duty each week, was provided with a complete script and given the assignment of setting right any mistakes which occurred.) The spontaneity which resulted from this procedure added to the sense of viewer participation.

In conducting the class sessions, the following principles of action for TV were evolved:

1. Talk to the student in the home. Give him a sense of participation.
2. Indicate the purpose of the particular work under way through questions to or from students.
3. Remember that movement commands attention better than static positions. (A breast mike enabled us to move about freely.)
4. Avoid too much lecturing. One has to be a highly skilled and talented lecturer to hold an audience on TV for 30 minutes. (Few college professors meet these requirements.) Furthermore, this would defeat our goal of stimulating viewer participation as active students.
5. Utilize visual materials—charts, aids, chalkboard, films—where appropriate. Avoid overdoing this.
6. Make class participation meaningful. Allow participation where required to heighten the sense of informality, clear up possible misunderstandings in the viewer audience or emphasize important principles.
7. Utilize variety where necessary to avoid dull repetition and boring routine.
8. Close each session with a strong ending.

The following principles and concepts of reading were covered on the series:

Ineffective vs. effective reading
The total act of reading (Spache's Reading Methods and Habits Test was used in this connection.)
The importance of vocabulary and background experience to reading
Vocabulary-building tools
Purpose as related to effective reading
Ways of reading to carry out different purposes
Organization and reading
Reading for the main ideas and for supporting details
Rapid reading—methods and place; skimming
Intensive reading
Critical reading

Evaluating what is read

Maturity in reading

In addition to the sources for further reading and for further self-help which are given in Spache and Berg, lists of resource materials were mailed to those requesting them.

Special charts and graphs were prepared for the series. In addiiton, the studio personnel devised a special way of televising printed material at controlled speeds. This device, termed the "crawl," was used whenever such controlled presentation was deemed advisable. A film series, designed on a new principle, was used in conjunction with the program. These films were prepared as an adjunct to the overall program. As mentioned previously, special exercises were prepared and mailed to those requesting the material. These exercises required the application of principles dealt with in the television series. Student questions were patterned after those most frequently asked by mail or by telephone. Student questions were also used to emphasize important points.

The formal enrollment in the course reached a number much greater than had been expected. In fact, the university book store had to reorder the Spache and Berg manuals twice. The viewer audience was estimated by the studio to number a great many thousands, and the program placed high in popularity rating among all the programs available to Milwaukeeans over the city's four television stations.*

During the first weeks of the program, telephone calls to the university flooded the switchboard on several occasions. Incoming mail kept two clerks busy. Many of the telephone calls and dozens of the letters came from areas outside normal WXIX-TV viewing territory.

Several other colleges and universities wrote us for details, and some requested complete scripts. A few assigned personnel to monitor all the programs.

Practically all of the adults registered for credit completed all requirements satisfactorily. Many adults who watched the program have since enrolled in classes being offered in Milwaukee by Marquette University or by other collegiate institutions. Hany high school and college students were motivated by their parents' interest and by their own experiences to enroll in one of the area reading-improvement programs.

The series was awarded the annual award of the Milwaukee County Radio and Television Council as the best program in its category—i. e., educational television.

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[*] Many high school teachers watched the series of programs. These teachers sought to learn more about reading so that they could help their students more effectively in developing their reading abilities.

[1] Dale, Edgar, "Reading and Related Media," *Adult Reading*, Fifty-fifth Yearbook, Part II, National Society for the Study of Education, p 100 seq, 1956.

[2] Gray, William S., "How Well Do Adults Read," *Adult Reading*, pp 33-34.

[3] Gray, William S. and Bernice Rogers, *Maturity in Reading*, Chicago; University of Chicago Press, p 239 seq, 1956.

[4] Spache, George D. and Paul Berg, *The Art of Efficient Reading*. New York: The Macmillan Company, 1955.

# Reading Improvement Programs in Industry

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The procedures, results, and numbers of reading-improvement programs in U. S. business and industry is of continuing interest to reading specialists in industrial, governmental, and educational organizations. The following report is based on a survey undertaken by the writer to add to the information concerning such reading-training programs.

The sample consisted of 275 training directors and other training personnel with equivalent titles who were members of the American Society of Training Directors, and who were employed in U. S. businesses or industries. To safeguard against any bias in selecting companies,* the author listed all members of the American Association of Training Directors who had an appropriate title. About half of the population was selected for the sample on the basis of size. Larger companies tended to be selected. Training directors who had addresses outside the United States were excluded from the sample, as were personnel from governmental and educational institutions.

The procedure used in the survey was to send a letter to each training director, asking his aid in completing the survey and promising a summary of the findings to those who did return the form. Enclosed with the letter was the survey form and a self-addressed, stamped envelope for its return.

The survey form consisted of both sides of a single sheet of legal-size paper. Most of the questions could be answered by checking or by writing a very short answer. The areas covered were frequently patterned after the questions used by Mr. H. O. Patterson in the survey reported in the Sixth Yearbook of the Southwest Reading Conference, Texas Christian University Press, Fort Worth, 1957.

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*The author had developed a package reading-improvement program for Perceptual Development Laboratories and was familiar with many of the companies which were using it.

The analysis of the returned questionnaires was carried out with two principles in mind. The figures reported should not be so numerous that they either bury the findings or imply an accuracy not supported by the data. The statistics should be in keeping with the accuracy of the data. Because of omissions and written-in responses, the data of the survey are rather crude. Accordingly, the analysis primarily used numbers of responses and per cent of the group being considered who made the response.

The results are based upon 165 returned forms. This represents a return of 60%. Of the returned questionnaires, 62 (38%) have programs available to their employees and 103 (62%) have no reading training.

Of the 103 companies with no reading program:

5 (5% of the 103) are planning a reading-improvement program.
53 (51% of the 103) are interested but have no plan.
27 (38% of the 103) are not interested at present.
18 (17% of the 103) have discontinued their reading training.

Included in the last two responses are the negative reactions—the criticisms of reading-improvement training. Even though there are only a few cases, it may be well to consider these criticisms. Of the 27 not interested in reading training, most indicated that other training needs took priority. Three stated that the present type of reading training was not sufficiently valuable to justify the time required. Of the 18 who had discontinued reading training, only eight were not satisfied; the others reporting "change of staff," "everyone trained," etc., as the reason for discontinuing their programs. The eight companies reporting discontinuation because of dissatisfaction gave as reasons: "course was superficial," "only speed oriented," "home-study kit wasn't motivating and wasn't completed," "poor instruction," and "insufficient interest."

Thus, 11% of the companies without programs were critical of present reading-training courses with which they were familiar. Their comments suggested that a course with broad objectives and good motivation would reverse their opinions.

Of the 62 companies where reading training is available to employees, 16 (26%) have the training conducted at local schools. The company frequently paid for part or all of the tuition, but most classes were conducted on off-duty time.

The remaining group of 46 companies (74% of those having reading training available) provides the data on the characteristics of industrial reading programs. In the following analysis the question will be given or paraphrased to better give the meaning in content. When percentages are given, they will be based upon the total of 46 companies. Because some companies did not reply to all questions, the percentages do not always total 100.

**How long have you given a reading-improvement program?**

10—Less than one year
5—one year
10—two years
7—three years
5—four years
7—over four years

**What is the approximate number you have trained?**

| Frequency of response | Number trained |
|---|---|
| 6 | 20 |
| 10 | 40 |
| 5 | 60 |
| 2 | 80 |
| 1 | 100 |
| .... | 120 |
| 3 | 140 |
| 4 | 160 |
| 1 | 180 |
| 3 | 200 |
| 1 | 220 |
| 1 | 240 |
| .... | 280 |
| 2 | 300 |
| 1 | 320 |
|  | .. |
|  | .. |
| 1 | 400 |
|  | .. |
|  | .. |
|  | .. |
| 1 | 500 |

**What level of employees participate in the program?**

3 (7%)—management only

30 (65%)—management, supervisory, and technical

9 (20%)—all of the above, plus secretarial and clerical

4 (9%)—everyone, including hourly rated

**What are enrollment conditions?**

6(13%)—voluntary

2(4%)—mandatory

(7%)—mandatory for some employees

Most companies left this item blank.

**How is instruction given?**

33 (72%)—group instruction

2 (4%)—individual instruction

10 (22%)—both group and individual instruction

**What is the average size of the group?**

| Frequency of response | Size of group |
|---|---|
| 1 | 5 |
| 15 | 10 |
| 10 | 15 |
| 9 | 20 |
| 3 | 25 |
| 1 | 30 |
| 1 | 35 |

**When is training conducted?**

16 (35%)—on duty

17 (37%)—off duty

6 (13%)—both

**By whom is training conducted?**

3 (7%)—personnel from local schools

13 (28%)—reading consultant outside the company

11 (24%)—reading specialist in the company

16 (35%)—non-reading specialist in the company

**What is the number, frequency, and length of the training sessions?**

In a combination clerical and proofing error, this item was left off the questionnaire. However, a number of replies contained the information, and later correspondence provided an answer that is probably representative of the group.

> 20-25 one-hour sessions was by far the most frequent, and they were usually given twice a week. Training sessions ranged from 30 one-half-hour sessions given three times a week to 17 one-and-one-half-hour sessions given twice a week.

**What are the specific objectives of the training?**

Under this question there were six objectives listed and defined so that they could be checked. In addition, a space was provided for writing in further objectives. Since checking is so easy, it is likely that some objectives were indicated which have relatively minor roles in the training.

45 (98%)—improve reading speed

42 (92%)—improve comprehension

22 (48%)—improve vocabulary

29 (63%)—develop flexibility of reading rate and technique to fit purpose and difficulty

12 (26%)—develop intensive reading skills (detailed understanding of difficult reading by some system of preview, read, and review)

27 (59%)—teach skimming techniques (reading important parts to get main topics, ideas, and conclusions)

.... —other

Some companies listed "learn to budget time" and "improve perceptual speed."

In identifying the components of the courses, the person completing the questionnaire was asked not only to check the different types of materials and procedures used in the course but also to list the names and makes of specific items used and to rank components in order of their value. Many questionnaires contained no rankings or only partial rankings. Average rankings, therefore, are not particularly meaningful.

There was little difference in average rank for the components. With these qualifications in mind, the components of the program are listed below in order of their value from most to least valuable.

### Workbooks

Thirty-four (74%) of the companies reported using a workbook. Specific books mentioned by more than one company (and the number of companies reporting using them) are listed below:

5—Perceptual Development Laboratories
4—Science Research Associates
4—Harvard
4—the companies' own, self-developed book
3—Brown
3—Baker
2—Robinson
2—Witty

Many other materials, including sixth- and eighth-grade readers, were mentioned by only one company.

### Films

Twenty-eight (61%) of the companies reported using training films. Specific film series mentioned were:

14—Harvard
6—Perceptual Development Laboratories
3—Iowa
2—Purdue
2—Educational Development Laboratories

### Tachistoscope

Thirty-three (72%) of the companies reported using tachistoscopic work. The specific instruments mentioned by more than one company were:

5—Perceptual Development Laboratories
4—Keystone
3—Society for Visual Education
2—Educational Development Laboratories
2—Speed-O-Scope

### Pacers

Twenty-one (46%) of the companies reported using pacers. Most did not specify the make. The only one mentioned by more than one company was Ratometer, which was listed by five companies.

### Tests

Thirty-three (72″) of the companies reported using tests. The specific tests mentioned by more than a single company were:

6—Perceptual Development Laboratories
6—Science Research Associates
4—Harvard
3—Diagnostic Reading Test

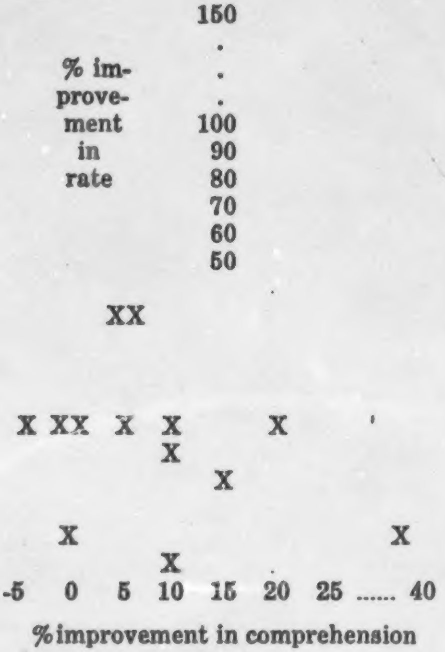
### Lectures and Discussions

Twenty-nine (63%) of the companies reported using lectures and discussions. Some of the topics mentioned were: "mechanics of reading," "flexibility," "planning purpose," "vocabulary improvement," "skimming," "scanning," "concentration," "intensive reading," "increasing comprehension," "critical reading," "overcoming bad reading habits," and "scheduling time."

### Results of Training for Specific Objectives

Most companies merely indicated considerable improvement in rate, and some added that comprehension was unchanged or improved. Only one company mentioned results for any objective besides rate and comprehension improvement, and that was a slight improvement in vocabulary.

Thirteen (28%) of the companies reported specific results for rate and comprehension as shown in the following scatter diagram:



In addition, one company reported an improvement of only 15% but gave no comprehension data. The results, according to the comments, were not in keeping with the results of previous classes. By inspection, improvement in rate is generally unrelated to improvement in comprehension. The usual improvement in rate for companies reporting retention data is about 100%, and the comprehension improvement is about 5%. It must be remembered that this is based upon only the 28% of the companies that reported actual values.

### Extent of Reading-Training Retention and Application to Work

Six (13%) of the companies reported data on retention studies; and as a result of positive student reports, the majority of the remaining companies indicated that they were confident that the new skills were retained and applied to t work. For those reporting follow-up testing six months to a year later, the percentage of rate improvement retained was reported as 50, 60, 68, 70, 80, and over 80% of the original gain made during training. Thus, the reports indicate that usually two-thirds or more of the improvement in reading rate is retained after six months or a year.

Ten (22%) companies made specific statements on application to work.

7—applies in great part to work
2—applies only if the individual tries hard to transfer his skills to the work situation
1—doubt that much of the skill is retained or applied

Other comments were positive: "work is accomplished faster," "desks are now cleared," "trained personnel finish routine reading easily."

### Comment on Reading-Training Programs in General

Twenty-seven (59%) of the companies rseponded to this item. Twenty-six thought the training was valuable, and nine of these used superlatives to express their enthusiasm. One company was doubtful of the value of such training. This same company reported a gain in reading rate of 100% and slight improvement in comprehension, but this was the one company which reported in the previous item that the retention and application of such training was doubtful.

Except for obvious relationships between such items, as age of the reading program and number of students trained, an inspection of the data provides very ilttle evidence of relationship between the various items. Both new and old programs are successful and are rated as valuable. Group size, objectives, and techniques employed do not seem to determine the satisfaction with the course.

In summary, a survey form was sent to the training directors of 275 of the larger business and industrial organizations in the United States to detremine the nature of reading-improvement programs in these companies. Sixty per cent of the forms were returned, and they indicated 62% of the companies have programs available to their employees. Over half of the companies without such programs are interested in starting some type of reading-improvement training. The courses given in the company-training programs are concerned with a number of broad objectives but seem centered around improvement of reading speed and comprehension. The courses have been quite successful in improving rate, with approximately 100% improvement achieved by companies which reported actual figures. Comprehension was relatively unchanged (±5%) for most of the courses. Most companies were confident that the results of the training were retained and applied to work. Six companies reported retention data that suggests that over two-thirds of the gain in rate made during the course is retained after six months or a year.

The courses taught in industry and business are primarily for management, technical, and supervisory employees. Training is given in groups of between 10 and 20 students and, for half of the companies, is given during working hours. Usually about 20 hours of instruction are given. The training most frequently occurs twice a week, in one-hour sessions. Various techniques and materials are used. The per cent of companies with programs using each of the following components is given in parentheses: workbooks (74%), training films (61%), tachistoscopic work (72%), pacers (46%), tests (72%), and lectures and discussions (63%).

Companies reporting in this survey have had reading-improvement programs from less than a year to over four years, most typically about two years. Each program has trained from 20 to 500 employees, most typically about 70. The satisfaction with a program does not seem to depend upon any single variable. Almost all of the companies reporting on their programs considered reading-improvement training in industry and business to be valuable.

# Critical Reading

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## The Importance of Reading Critically

Vance Packard's new book on the subtleties of modern advertising has reaffirmed the need for critical evaluation of the great bulk of our reading matter. As reading specialists, we may deplore the gullibility of the buying public which has been induced to spend its money. As consumers, we can learn from *The Hidden Persuaders* that we, too, have probably been tricked into the purchase of things we didn't want or need. And the public is apparently being hornswoggled out of its suffrage as well as its money, for in the late chapters of *Persuaders* Packard describes techniques planned and used to recruit voters during major elections and to mould public opinion at various seasons.

From an idealistic point of view, tampering with the minds of voters is perhaps the most urgent reason for teaching and practicing critical reading, not so much because Americans consider their suffrage as inviolate as the privacy of their romantic affairs, but because the perpetuation of any democracy seems to rest on an electorate that is reasonably well informed. In the early nineteenth century, some of our civic leaders recognized the political and cultural ignorance of the general populace and recommended wider reading as one means of enlightening the electorate. In that age, ignorance was usually the result of a lack of information, whereas today it is often caused by uncritical acceptance of misleading information.

The need for critical evaluation of social and political context was well illustrated earlier in this decade by the semi-hysteria concerning Communists in government, and loyalty, a hysteria which branched from the stem known as McCarthyism. The moderate conservative may agree that the hysteria of a few years ago was unfortunate, but may insist that we can be grateful that it has passed and that the political climate has returned to near normal. The critical reader, moderate conservative or otherwise, is also thankful for the improved climate, but he can't easily brush off the hysteria of other days, because he knows that we are still suffering from some of its results. One of the obvious prerequisites for critical reading is a background of information, which depends considerably on the reader's ability and willingness to remember important events and facts. In recent months, the State Department, the Foreign Service particularly, has been under heavy criticism, and has been accused of ineffectual and inept handling of our international affairs. The uncritical thinker is prone to believe that current problems are mostly the fault of John Foster Dulles and his present representatives around the world as well as in Washington. The more critical reader remembers that the Foreign Service was seriously disabled earlier in this decade by such unfortunate practices as: (1) the discharge of career men such as John Paton Davies, (2) the badgering of the foreign offices by McCarthy's young aides, Cohn and Schine, and (3) the purging of our Overseas Libraries in a manner that amounted to book-burning. Of course, not all the problems of our Foreign Service can be blamed on mistakes of several years ago, but few will deny that the service is still suffering from damage done in the early fifties. Anyone who doubts that the irrational period was really so frantic may be reminded of the condemnation of the *Girl Scout Handbook* by the Illinois convention of the American Legion because it contained a line about "world citizenship;" or the furor about eliminating *Robin Hood* from Indianapolis school libraries because it is allegedly socialist doctrine; or the rejection of three well-established geography texts by the Houston school board because the books contained positive reference to the United Nations.

In what way does this hysteria indicate a need for critical reading skill? The hysterical segment of the population had allowed itself to be unduly stirred up by professional patriots on the basis of information and claims, most of which would have been—and were—rejected by critical readers. At the time of the discharge of John Paton Davis, the better newspapers carried feature and editorial articles explaining that Davies had not been accused of any sort of disloyalty or malfeasance, that his only "offense" was that he reported conditions in Asia as he saw them and that these reports were unpopular with a certain segment of Congress. Or, on the issue of the Overseas Libraries, the critical reader would have observed that many of the books being discarded were concerned with subjects not at all related to loyalty to the United States; some were being abandoned because they were authored by persons whose loyalty had been challenged only by hearsay, and even then only in a fantastically remote way; and a few were books that have been accepted by Americans for years without any suspicion. Noting that there was apparently no damage being done to our status abroad by these books, and knowing that our prestige could be damaged by book-burning, the critical reader would not have become a part of the rabble which endorsed the rejection of so many books in the Overseas Libraries.

Turning back to the subtleties of advertising, the reading specialist is confronted with a second powerful reason for teaching critical reading skill to his students. The Federal Trade Commission is supposed to protect the public from gross falsehoods in national advertising, but the advertising experts are not much restricted by the FTC since they have long since figured out how to delude the consumer without saying something that offends the regulatory agency.

The language of advertising has always been full of the sort of exaggeration that we tend to associate with Hollywood. The terminology of advertising reminds one of a statement written by Thomas Jefferson to George Washington: "Such is become the prostitution of language that sincerity has no longer distinct terms in which to express her own truths." It is difficult to imagine what Jefferson could have said about the abuse of fact in the language of advertising in the twentieth century. But in the middle of this century, extravagant claims for a product or service are no longer enough; in some fields of merchandising they may even be passé. Today's advertising writer has enlisted the aid of psychiatrists who apprise him of our basic drives and motives; then he pitches his advertsing copy toward the real or imagined satisfaction of those motives. The result is a sort of legal confidence game—legal because it is within the limits of the law, and a confidence game because the psychological processes of the buyer and advertiser are respectively almost identical with those of the naive widow and the confidence man who takes her money. It is disquieting to observe that if one confidence man takes ten thousand dollars from one widow by offering her some affection that she thinks she wants, he may be prosecuted (if caught), but if a toothpaste manufacturer takes fifty cents from each of ten million people by offering them a protection which they think they want, there is no violation of the law unless the advertising is fantastically exaggerated. Some objector might argue that this comparison is unrealistic, since the con man's affection was neither genuine nor enduring; it is quite possible that the protection claimed for the toothpaste is not real or lasting but is simply the product of an advertising writer's imagination.

It is possible to take the view that nobody really believes advertisements and that therefore this is not a sufficiently crucial matter to provide a reason for teaching and developing critical reading skill. This notion is dispersed by the three basic assumptions of the Madison Avenue advertising specialists: (1) People don't know what they want to buy. (2) People cannot be depended upon to tell you the truth about their wants even if they know what they are. (3) People (consumers) can't be trusted to behave in a rational way. In chapter two of *The Hidden Persuaders,* Packard lists a number of illustrations which support these assumptions and which provide amusing and astonishing reading.

One good illustration of a way in which nearly all American consumers have been taken in by advertising is provided by the acceptance of "psychological obsolescence." Once the manufacturers of various durable items had provided enough of those items so that most buyers had enough, there was the problem of finding a market for such products in the future. In order to induce more purchases of the same products, the manufacturers developed the yearly model change, so that each year's model is obviously different from last year's, and last year's is thus beginning to become obsolete. Of course, progress in the development of new products is desirable and almost necessary, but often the new model is different from the old only in appearance or minor details. Because the bulk of consumers read advertising uncritically, they feel that their appliances are out of date and hasten to acquire new ones as soon as they can afford them. It is interesting to observe that the highly popular Volkswagen has undergone no discernible model changes in recent years, and at the same time its trade-in or secondhand value has remained quite high. If the American market for Volkswagens had been saturated, the German manufacturer might have stimulated new sales by the American device of creating a new model which made the old one appear dated.

A type of advertising which may be impervious to even the critical reader has been used experimentally in recent months. With sub-liminal advertising the critical reader has no chance to employ his skills of evaluation and analysis, since he is not aware that he is reading any of the advertising. At present, the moral and ethical implications of this sort of invasion of readers' minds is being considered by the Federal Communications Commission and other regulatory agencies.

The daily judgments and decisions which we make in social, scientific, esthetic and philosophic matters provide a third major reason for reading critically. Practically everyone wants to be "right" as often as possible when making the commonplace or important decisions of his life; scarcely anyone is willing to be fooled if it is avoidable, even in situations which do not involve his money or his vote. The 'Letters to the Editor" in most newspapers indicate that Americans are concerned—even excited—about a great variety of non-political and non-economic aspects of existence. These same letters quite often reveal a lack of critical thinking skill on the part of their writers, and because of the faulty logic, it is important for the readers of these contributions to exercise evaluation skill so that they will not accept weak arguments. In this decade, many "Letters to the Editor" on the subjects of race relations and school desegregation illustrate the need for critical thinking by both writer and reader.

Adults seem more inclined to read critically about the natural sciences than about social subjects, but the following excerpts from a seventeenth century booklet show that it is easy to employ poor reasoning even in science:

> Now of this notion that the world is spherical or globe-shaped, let us hear no more . . . It is noteworthy that the arguments for a spherical world are commonly presented by those who live on or by the sea, notoriously an untrustworthy kind of men and accustomed to invent strange tales for their own glory and for the pleasure of those who hear . . .
>
> These seafaring men tell us they know the world is spherical, for they have sailed right round it. But do they tell us how they kept their ship from falling off the globe, as they sailed round the other side?
>
> It is these same seafaring men who state that the world must be spherical, because at sea the hull of a departing ship disappears before its masts. But there are many other explanations for such a phenomenon than the sphericity of the world. It may be that there was a haze on the surface of the sea at the time . . . Or, alternatively, a ship that is observed to disappear in this way may in fact have sunk. Did these talkers about the world being round love truth so well that they followed in a second ship and made sure that the first ship had not sunk?
>
> And so on, ad infinitum. The world is flat and will continue to be so, because it is the nature of the world to be flat . . . (From "A Treatise Dismissing the Theory of the Rotundity of the Earth," by Tito Ticinelli. 1611.)

It may seem incredible that anyone could have read and believed Ticinelli's treatise, even in 1611, but some of his expressions represent types of argument which are still common. For example, his rejection of the rotundity of the earth because the people who advance the theory are notoriously not very reliable, is of a style popular with twentieth-century politicians, and his final argument that it is just "the nature of the world to be flat" rests on the same kind of thinking as the claim that "Nature did not intend for the whites and Negroes to go to school together."

### How Do We Teach Critical Reading?

Because critical reading requires intelligence, a background of information and a scientific approach, none of which is readily susceptible to improvement by short-term teaching, some reading instructors may doubt that critical reading ability can be improved enough to justify the instructional time and effort. However, in adult reading courses, much of the improvement in comprehension seems to result from the increased awareness of the elements of comprehension; that is, after frequently answering questions about the main ideas or the organization of selections, the readers are more sensitive to the main ideas and the organization as they read, and thus they perform better on comprehension tests. In the same way that readers improve their general comprehension as they become sensitive to the components of comprehension (including of course, many elements other than main idea and organization), they can become better critical readers when they become aware of the purposes which motivate authors, on the one hand, and the effects which their own personalities have on their acceptance or rejection of various printed ideas, on the other hand. While the necessity for intelligence, background information and an open mind cannot be ignored, it is possible to improve the reader's evaluative ability within these limits by increasing his inclination to ask: "What reason did the author have for writing this?" or "What is there about me that causes me to like this point of view?" Like main idea and organization skills, these two questions represent only two of a number of possible abilities which can be enlarged to help student readers become more critically analytic.

A) In considering a curriculum for teaching critical reading to college students and other adult readers, it is convenient to begin with some basically mechanical tools for evaluation. These tools have often been provided in the secondary schools, but they may need sharpening again. They include such learnings as:

1. Awareness of the value of the copyright date in determining the adequacy of a selection. Not many months ago, an article in *Fortune* told of American superiority over Russian efforts in the research on guided missiles and satellites. Then along came Sputnik, and all such articles were instantly out of date. Developments in the missile and satellite fields take place so rapidly that the copyright date is a valuable clue to the authenticity of a printed article.

2. Knowledge of the author's background and reputation. Because Rudolph Flesch had written a number of books which over-simplified certain aspects of the language arts, his book *Why Johnny Can't Read* should have been treated with some suspicion right from its first appearance, at least by those who knew his past tendencies.

3. Familiarity with the publisher's background and reputation. In this case, *Why Johnny Can't Read* provides a very unsatisfactory illustration, since it was published by Harper and Brothers, usually a reputable publisher. In judging it partly in terms of the publisher, a reader would be inclined to give it too much credence. However, Harpers had published many of Flesch's earlier writings, so the reader who had this information would discount his appraisal of Harpers whenever judging one of the Flesch products. A better illustration of the use of the publisher's background as a basis for beginning an evaluation is offered by articles on educational trends in the *New York Times.* Because the *Times* and its education editor, Benjamin Fine, have such outstanding reputations, many readers would assume that a *Times* article on the quality of science training in American high schools was accurate unless they had very good reason to believe otherwise.

Student readers, even if middleaged, should learn that the *Reporter* is a liberal magazine, though probably not so liberal as the *New Republic,* and that the *Atlantic* is just a shade more "literary" than *Harpers,* which is the stronger in social science articles. They should realize that most of the books published by the Beacon Press of Boston would be satisfying to members of the American Civil Liberties Union, whereas the Henry Regnery Press of Chicago leans strongly in favor of isolationists and the ideals of America First. Again the specific items listed are only samples,

4. Consideration of the intended readership. A knowledge of the readership toward which a publication is pointed is of great help in understanding its level of readability and the quality and depth of the logic.

B) The second level of this prospective course of study in critical reading for mature readers includes some skills which are slightly more intellectual and less mechanical. One item to be taught is an awareness of the sources of bias in printed matter in general, as well as the specific kinds of bias which are likely in certain kinds of reading material. In his book *How to Read a Newspaper,* Edgar Dale lists the sources of bias that may influence the points of view in that medium of news. It is appropriate to consider sources of bias for all other types of printed material in similar fashion.

The Republican ownership of newspapers illustrates simultaneously one source of bias and a second instructional topic, the effects of censorship. Because the major newspapers of the country are owned by large corporations or wealthy families, many of them tend to favor the Republican cause, although this bias may not be very obvious except in the heat of an election campaign. During the last presidential campaign the *Christian Science Monitor,* a mild supporter of Eisenhower, reported that over 80 per cent of the nation's dailies were favoring the Republican candidate. While the percentage of papers endorsing the Republican standard-bearer usually is not that high, he nearly always enjoys more editorial approval than the Democratic candidate. The knowledge of this tendency will gratify Republican critical readers and annoy Democratic thinkers, but both groups should at least know of the existence of the bias, and for the so-called independent voters it is probably even more important to know of it.

The wealthy ownership of news sources is also responsible, in some cases, for a type of censorship which influences our thinking more or less by omission. Some of these news sources simply do not bother to report news which they do not care to have the public know. A prime example concerns a proposed amendment to the Constitution of the United States. This particular amendment would make it impossible for the government to levy an income tax of more than 25 per cent. It is quite obvious that such an amendment would favor the wealthy and hurt the unwealthy, since whatever income the government lost in reduced income taxes on the wealthy would have to be made up in some other way. This amendment was proposed several years ago, and has already been ratified by more than half the number of state legislatures required for adoption, yet practically no one in the citizenry at large even knows of its proposal, and the press almost never mentions it. The effect of this sort of censorship poses a unique problem in the teaching of critical reading, since the reader can't evaluate context which is not available. It is possible, however, to identify censorship wherever it is known to exist, and the reader can compensate somewhat in his thinking for the information which he knows has been withheld. This is, of course, not a very satisfying procedure.

C) The prospectus for teaching critical reading includes the development of attitudes conducive to evaluation. In the long run, the reader will develop a general mild suspicion of printed sources, but this attitude results mostly from specific attempts to teach other critical habits. One such attitudinal habit is the practice of questioning the motives and purposes of authors. The reader must learn to ask himself, regarding most printed selections, "Why did the author write this? What did he hope to gain from saying this?" Any reader who can ferret out the author's purpose for writing has taken a long first step in the evaluation of that article or book.

Another attitude which is not so easy to teach—or learn—is the willingness to study one's own biases and try to allow for them when reading about a subject that contains the ingredients for controversy. It is difficult for a reader to develop this tendency, because his biases are so often deeply rooted in his emotional life that it is nearly impossible for him to identify his biases realistically. Even when the prejudices are recognized, the human inclination is to defend and rationalize them. The attempt to counter-balance personal bias can probably be taught best as a part of the reader's more general habit of asking himself, "What is there about me that makes this appealing (or repulsive) to me? What preconceptions do I have that cause this logic to seem reasonable to me?"

D) A fourth "unit" in the curriculum for critical reading calls for the teaching of the definitely intellectual aspects of the evaluative task. The reader must develop the ability to discern whether or not a given piece of prose really says something. On the very first page of the foreword to *Preface to Critical Reading*, Richard Altick presents a five-paragraph excerpt from a speech which might have been given at a commencement exercise or a Legion convention. In spite of the fancy language of the speaker, a brief analysis of the excerpt reveals that it really says nothing at all. This skill of deciding whether an article says anything is a good one to use first, because it may eliminate the necessity for any further analysis.

Sensitivity to the semantics of argument and propaganda constitute a second set of intellectual skills to be included in the critical reading program. A study of the interaction between language and personality as a part of the reading instruction will of necessity be only introductory, but it will help the reader to understand many of the simpler critical processes already listed.

Development of skill in appraising logic is another of the more intellectual skills needed for reading with evaluation. While this requires sincere application on the part of the learner, both student and teacher benefit from the abundance of textual material on this subject. Logic is one portion of the critical process which is considered extensively by all the texts which treat the subject of critical reading or thinking, so that multitudinous examples of good and poor logic are readily available. One or two of these texts, such as Stuart Chase's *Guides to Straight Thinking*, provide such pleasant reading that students would be willing and able to learn about the logical fallacies on their own.

Considering the subtlety of advertising and political propaganda, it is probably reasonable to say that critical reading is more essential and more difficult than ever before. Even with the instructional program outlined, there remain some disturbing questions: With governmental and local censorship, how can the reader tell how much information isn't available to him? Is a complete evaluative objectivity desirable, even if it is attainable? Is advertising becoming so seductive that critical analysis of it is not possible? These are certainly disarming questions, but as the more fundamental skills of critical reading are adequately taught—and learned—some answers to these problem-questions should be forthcoming.

# A Study of Social and Experiential Factors Related to the Reading Abilities of College Freshmen

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Each year a rather large number of students enter college who have functional reading levels far below their expected educational achievement. Some of them read so slowly that they can never expect to complete even the minimum reading assignments required for their classes. A few of them do not have a basic vocabulary which would enable them to read meaningfully, and many of them are not able to organize and remember the material read. Some fail to adjust their rate to the purpose for which they are reading. Many of them, in fact, have no clearly defined purpose as they begin their study tasks.

Educators have long been concerned with the causes of reading retardation. Intellectual, emotional, educational and neurological factors have all been proposed as possible causes. Sometimes these proposals have been met with such enthusiasm that it would seem that the sole cause of reading retardation had been discovered. But instead, research has indicated the complexity of the reading process and the probability that several factors may be operating in any one case of reading disability.

The position of lower-class youth in our society has been a concern of some educators. Dr. James Stroud[1] cites studies which indicate that lower-class youth are not represented among our better students in the proportion which might be expected from their intelligence measures. The motivation of such students creates a real problem—a challenge which our schools have not met with outstanding success. It would seem that there is still much research which needs to be done to discover precisely which educational and social elements have a motivating effect, and which elements are acting as a deterrent in this respect.

In an effort to obtain more information concerning remedial students, Dr. Richard Braddock, of the State University of Iowa Communication Skills Department, prepared a lengthy questionnaire designed to discover social, experiential and educational backgrounds of beginning college students. In the fall of 1956, this questionnaire was completed by two groups of S.U.I. college freshmen. One group was comprised of students who met certain standards of proficiency in speaking, writing and reading, and whose scores fell approximately in the uppermost decile of the entering freshman class. These students were called the "exempted group," since they were excused from courses in this area. Another group whose cumulative scores were in the lowest decile were placed in a group given remedial instruction.

For the purpose of this investigation, certain items pertaining to reading were chosen from the questionnaire, and responses for 101 exemptees and 81 remedial students were compared. A cursory examination of responses indicated certain trends; however, without statistical treatment, few facts could be inferred with any degree of certainty. For example, only about 13 per cent of the fathers of the remedial group completed four years of college, while about 40 per cent of the fathers of the exempted group obtained this much formal education. Although this observation is somewhat meaningful, it does not consider the likelihood of chance factors. For this reason, some statistical treatment of the data was necessary.

When the hypothesis (that the distribution in the population is uniform) had been set, the Chi square ($X^2$) test of independence was chosen as an appropriate measure of the discrepancy between fact and hypothesis in the sample. According to statistical authority,

> . . . $X^2$ is an index of the divergence of fact from hypothesis. If each of the observed frequencies agreed exactly with the corresponding theoretical frequency, $X^2$ would be zero. The greater the divergence of the individual observed frequencies from the theoretical, the greater the value of $X^2$.[2]

For example, the statistical computation for the question concerning the fathers' education yielded a value of 26.045. According to the appropriate statistical table, in order for it to have been significant at the 1 per cent level, the value of this item would have needed to have been only 13.277. There is, then, only one chance in 100 that the observed relationship is due to chance, and there would seem to be a decided relationship between the father's formal education and the membership of the student in the exempted group. Formal education of the mother was also significant at this level, with, of course, the mothers of the exempted group having had more years of formal education than did the mothers of the remedial students.

Occupations of the parents were rated on a scale which consisted of seven classifications, ranging from the most highly trained professional people and holders of important managerial positions to the lowest classification, which consisted of unskilled workers. The father's occupation was used for the classification unless the occupation of the mother was in a higher category, in which case the latter was the sole criterion. Thus, in the case of a family in which the father was a truck driver and the mother was an elementary school teacher, the occupation of the mother was used since it was believed that this classification would reflect more realistically the cultural climate of the home. This occupational classification was significant at the chosen 1 per cent level. More of the parents of exempted students were in the professional and other higher occupation classifications, while many of the parents of remedial students were in the lower half of the classification scale. With the group studied, it was interesting to note that none of the students from either group recorded occupations which would fall in the lowest occupation ranking. Leisure time activities of the mother seemed to be relatively unimportant. Activities such as watching television or listening to the radio, reading newspapers or magazines, and taking part in community or political affairs did not reach the 1 per cent level of significance. However, whether or not the mother played cards or indoor games was significant at the 1 per cent level, with the mothers of the better students engaging in these activities more often than did the mothers of the poorer students. Employment of the mother outside the home before or during the time that the child was in elementary school was not statistically significant.

The number of books owned by the student himself was significant, as were the number of books in the home which were owned by persons other than the student. There was also a difference in some kinds of books owned by the students. Sports stories, adventure and love stories and literary classics were all significant categories, with the better students owning more books in each classification, except for sports stories. Literary classics owned by others in the home were also significantly different for the two groups, with more books in the homes of the exempted students. Health and do-it-yourself books were owned by a slightly greater proportion of the remedial students than by the exempted students, but the difference was statistically insignificant.

The better group included more students who were read to as children, and these favored students were read to more frequently. Present reading habits of students were reflected to an extent in the number of books reported read in a typical month by the members of the two groups. This item was also significant at the 1 per cent level of confidence with considerably more books having been read by the exempted group.

The family ownership of both radios and television sets was insignificant, although such ownership of phonographs and of typewriters were of significance. Typewriters were not only found in the homes of the better students, but were used more often by such students. The better students also wrote more letters, although this was significant at the 2 per cent level rather than at the 1 per cent level.

The size of the high school graduating class was one of the few items in the study pertaining to educational background. Almost 29 per cent of the remedial students graduated from classes numbering less than thirty, while only slightly more than 10 per cent of the exempted group graduated in classes of this size. At the other end of the scale, 61 per cent of the exempted group graduated in classes of over 100, while 44 per cent of the remedial group finished school in classes of over 100. The item was significant statistically at the 1 per cent level of confidence.

The results of this study would seem to indicate that there are social and experiential factors which are associated with poor reading ability. More extensive research in this area will certainly yield more precise data than has been reported in the above investigation. One such study, conducted by Walter R. Hill, is now in progress at S.U.I. This investigation is concerned with the relationship of the reading performance of college freshmen to certain other factors. Included in the study are considerations of intelligence-test measures, personality scales, socio-economic and educational backgrounds and certain selected academic factors. Through studies such as this, we may expect to learn much more concerning the causes of poor reading.

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# Review of Recent Research on College and Adult Reading

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The research and other articles treated in this review represent, for the most part, reports presented in the literature since the time of the review, presented at last year's conference by Sommerfeld.[43] Somewhat of a decrease in research reports in the literature was noted by this reviewer as this paper was being prepared. A considerable proportion of the material appearing in the last yearbook of this conference[10] was found to be pertinent for purposes of the present review. Had this not been included, the list of references accompanying this report would have been noticeably shorter than the bibliographies of previous reviews. Causey's request for reports of recent and current research relative to improvement of college reading, sent to nearly 200 colleges and universities last year, resulted in reports of only 22 studies in progress, seven studies completed but not published, and four studies completed and published.[9] (Some of the studies reported as completed but not published have since been published.)

As in past reviews, this one has been organized in terms of several broad headings, somewhat arbitrarily determined. Chiefly for purposes of convenience, a few reports were treated under areas to which those reports might seem only vaguely related.

## Descriptions and Evaluations of Programs

A number of the reports found in the literature included, to varying extents, descriptions of reading improvement programs. The major intent of some reports was one of describing or explaining specific programs; in other reports such descriptions were secondary or incidental. A majority of the programs described were ones involving college groups[5 12 13 15 18 20 24 25 31 32 33 35 39] but there was also an appreciable number concerned with non-college adult groups.[8 11 16 23 28 36 41] A number of reports were presented at, and/or published in the yearbook of last year's Southwest Reading Conference.[10] As has been noted in previous research reviews presented at this conference, reading-improvement programs continue to vary greatly with regard to types of personnel conducting such programs, selection of participants, printed materials and instruments used, testing and evaluating procedures employed, length of programs, bases for referrals, extent of individualization, reading skills stressed, and other factors. Similar findings have been reported as results of Dabb's review of a number of remedial English classes reported in the literature,[13] Dowell's survey of reading programs in governmental agencies,[16] and Patterson's survey of programs in industrial corporations.[37]

Criteria used in judging effectiveness of programs varied considerably, as has been true in the past; and more than one criterion was applied in a number of programs. Judging by information presented in given reports, evaluations relative to some programs were, apparently, primarily subjective. Quantitative data were presented in a number of reports, but in many cases the data and information presented were insufficient for determining whether or not apparent positive results were statistically significant. Several investigators called attention to the need for control groups and for equating or matching groups when evaluating programs;[31 32] but control groups were involved in only five reported studies.[5 25 31 32 36] The criterion most frequently indicated as having been employed was amount of gain as determined by the difference between pretest and posttest results.[5 11 12 20 24 32 33 35 36] Rate gains tended, rather consistently, to be considerable; but comprehension changes in programs, where indications of such changes were given in reports, tended to be slight. In studies for which application of statistical tests was indicated, comprehension increases were not found to be significant.[30 32] Gliessman and Hodell[20] reported that, while comprehension changes indicated by Diagnostic Reading Test (Survey Section) results were not significant, results obtained with workbook tests indicated a significant decrease in comprehension. Noticeable apparent increases in both comprehension and vocabulary skill were indicated in reports by Jones[24] and by Mills.[35]

A number of evaluations relative to permanency of gains were reported. Out of 19 former participants retested at the end of the Sixth Adult Reading Clinic, conducted by the Trenton, New Jersey, Free Public Library, only two "retrogressed" to or below Diagnostic Reading Test scores achieved at the beginning of their training periods; two "showed no increase" and 11 "dropped slightly" from pretest results; and four "showed continued improvement."[11] Although rate scores showed a slight decrease. Patterson[36] found each of his three experimental groups showing considerable retention of rate and comprehension improvement (as reflected by Diagnostic Reading Test scores) eight months after an experimental reading-improvement program with supervisory personnel. Kingston and George[25] attempted to ascertain the influence of special reading training upon development of reading skills between freshman and junior college years by comparing rate and comprehension gains (Diagnostic Reading Test) of 73 juniors who had previously participated in a reading program with scores of 87 juniors who had not been participants. All students involved had been given another form of the test at the time of college entrance. Both groups were found to have made significant rate gains from the freshman to the junior years; but the participating group had made significantly greater gains over the other group. Significant gains in comprehension were made by only the participating group. The investigators interpreted their results to indicate that rate gains would tend to be made whether training had been received or not, although special training seemed to bring about more effective gains; but little or no gain in comprehension would be made without special training intended to promote development of this skill. Reed[32] found an experimental group of Wayne University nursing students who had received special training in reading maintaining their significant end-of-program superiority in reading rate (Diagnostic Reading Test) over a control group, whch had not received such training, seven months after the end of the experimental program; but the vocabulary superiority obtained at the end of the program was found to be no longer present.

Indications of academic success were also used as criteria of effectiveness of programs in several studies.[5, 18, 31, 32] Blake[5] reported results of a recent and several earlier evaluations of University of Maryland compulsory study skills and reading-training programs. In a 1952-53 program evaluation, the academic performance (sociology grades) of a group of 139 probationary student-training participants had been found to be "somewhat comparable" to that of a control group of 122 probationary students. Blake interpreted results obtained in a follow-up study with a second group of probationers to be clear indication that large numbers of probationers do succeed and that their "considerable" academic success was "at least partly due to the training the reading-and study-skills program." (5:91.) McDonald[31] compared an experimental group of 116 students who had completed the Cornell University reading-improvement program with a control group (carefully equated on a number of bases) of 142 students who had applied for the program but could not be admitted. He found the students in the experimental group to have made significantly better cumulative grade-point averages for three semesters, to have made significantly more grade-point averages above a criterion point of 70 than did the control group, and to have had significantly fewer dropouts than did either the control group or the remainder of the freshman class. A somewhat contrasting picture (relative to academic success) was presented in several other reports. Reed[32] found no significant difference between honor-point average of his experimental group of nursing students at the end of a semester and that of a matched control group of nursing students who had not participated in a reading program. Fiehler,[18] in a report appearing in the last yearbook of this conference, revealed that, out of 295 enrolled in various communication skills improvement programs at Southern State College (Arkansas) over a three-year period, only 100 had continued in college or had been graduated. He pointed out that "there is no future in reading-improvement work if it becomes merely synonymous with remedial teaching, whatever that is."(18:55.)

Reactions of participants, obtained mostly with the aid of questionnaires, were indicated in a number of reports.[5 11 12 20 23 28 37] Opinions of participants as to values and benefits obtained from programs have continued to be predominantly favorable. In one program sponsored by a public library the fact that over half the participants were found to have enrolled because of recommendation of the program by previous participants or by persons knowing of participants was considered as an indication of the program's effectiveness.[11] In two other library-sponsored programs,[23 28] participants' increased pleasure in reading," as observed by the librarian-directors of the programs, was considered evidence of effectiveness.

Two studies were chiefly concerned with comparisons of methods used in reading programs. In a study reported by Mills,[35] two instructors each taught one freshman English class in which was used a regular syllabus which stressed teaching of writing techniques. Each also taught a second class in which a reading textbook, Congleton and Morris' *The Meaning in Reading* (Harcourt, Brace and Company, 1956), was used. No direct instruction in rhetoric and grammar was given this experimental second class, although members took the same series of ten-minute grammar quizzes as did the first group. While experimental students had lower Cooperative English Test scores at the start, they were reported to have made better grades than did the control sections; and "noticeable improvement" in writing and grammar was noted. While results were not conclusive, these were "so encouraging" that English faculty members voted to use the experimental reading plan with all freshman English classes. Patterson reported the results of an experimental reading-improvement program with a division of General Motors Corporation.[86] In addition to a control group, three experimental groups were involved. One group used both individualized and group mechanical equipment; a second group used only group mechanical equipment; the third group used no mechanical equipment, but utilized lectures, discussions, and practice on individual exercises instead. While greatest retention (in terms of a "Reading Index" eight months after training) occurred with the no-equipment method, none of the differences in reading gains made among the three groups was found to be statistically significant.

Mann[83] reported an attempt to evaluate changes in students in a college reading program both statistically and clinically. In addition to statistical analyses of gains indicated by pretest-posttest differences, extensive analyses of clinical observations and experiences were also made. These clinical analyses resulted in a number of hypotheses and conclusions, relative largely to personality and emotional factors in reading disability and reading improvement.

## Materials Related to Reading Programs

A number of reports and studies were concerned with analyses of materials used in reading-improvement programs or yielded results which have possible implications relative to such materials. Miller[84] analyzed 33 college reading workbooks in terms of 25 specific factors, each factor being subsumed by one of five broad headings: Basic Data, Types of Exercises, Length, Special Features, and Extent of Use. An annotated list of practice-type materials intended for use at below-college levels but used with poorer college readers with purported and/or seemingly effective results was presented by Bliesmer.[6] Dotson[15] presented a listing of reading workbooks or manuals classified, on the basis of experiences with students and the manuals, according to "difficult," "medium," and "easy" difficulty levels.

McConihe[30] reported finding no differences in readability when two business groups read two forms of an article, into one form of which "four psychological variables . . . selected as exemplifying conditions under which learning occurs"(30: 409), a sentence variable, and a word-length variable had been written. (Further explanation or clarification of the various variables was not given in McConihe's abstract, the only information available at the time this review was being prepared.) Gillie[19] presented a "convenient and simple" formula for measuring abstraction in writing. The formula was based in part on, and validated against, the Flesch abstraction formula; and application of the formula involves determining numbers of definite articles, numbers of finite verbs, and number of "nouns of abstraction." Results of two more studies in their series on relationships between various learning materials to learning of technical (aircraft mechanics) materials were reported by Klare, Nichols, and Shuford. In one study,[26] they found that "square span" presentation of material (units of material presented in two-line blocks set apart by spacing) slowed readers on the first reading, but practice tended to decrease this effect. "Spaced unit" presentation (single-line arrangement of regular typography but units separated by spacing) was found to have little effect on reading speed. The two experimental arrangements were less acceptable to readers than was a traditional, or standard, arrangement, but this reaction was less marked with small than with large thought units in the arrangement. In the other study,[27] it was found that "easy" style, as compared with a "hard" style, produced significantly greater words per fixation, words read per second, and recall scores. Three readings, as compared with one, were found to produce significant increases in words read per second, recall, and recognition measures. High ability subjects received significantly higher scores on all four dependent measures used; but there were indications that a stronger set to learn might have played a part. Tinker[45] concluded, on the basis of results obtained in a study of effect of various angular departures from horizontal alignment of printed lines upon reading speed and visibility, that printed materials should be held so that no marked deviations from horizontal occurred when reading. In another study, Tinker found significant reductions in reading rate and in ease of perceiving words when printed material was presented on a curved surface, as compared with flat copy. He suggested that the marked curvature present in large books could be avoided, and readability could be improved, with the employment of wider inner margins in such volumes.

Allias[1] found the difficulty levels (Yoakam readability formula) of a "selected set of mass magazines" to range from grade levels of 8.0 to 13.6, with a median difficulty level of 10.8. Most (36%) of the magazines fall within the 10.0 to 11.0 grade level. The median difficulty level, 10.8, was found to be only 0.1 less than the median educational age, 10.7, for major occupational groups. Judging from mass magazine circulation, Allias concluded that the average wage earner is capable of reading beyond his educational age.

## Tests and Testing

Program descriptions in which identification of specific testing instruments used were found, continue to indicate considerable variation in particular reading tests used. Several different reading tests and/or aptitude and personality tests were indicated as being used in a number of programs. Dissatisfaction with several widely used tests apparently prompted some to develop their own tests.[12] Several studies related to test construction and testing techniques were reported. Humphry's study, reviewed at last year's conference on the basis of an abstract (10:68), was reported in more detail recently.[22] Results of his investigation of various methods of measuring reading rate led him to conclude that rate tests with relatively short time limits would yield as valid results as those yielded by tests involving longer time limits or testing time, even though he found significant inter-individual and intra-individual differences in rate during successive time intervals when relatively long selections were read. Reed's investigation[32] included analyses of relationships among various obtained reading test scores. He concluded that rate is "an independent factor in the reading process" and that the vocabulary section of the test used in his investigation is, in part, a measure of rate. Bennett and Doppelt[8] concluded, as a result of a study of time taken to answer easy and difficult four-option vocabulary items, that a definite relationship between vocabulary ability and rate of responding apparently existed, with such relationships being less marked with hard items than with easy items, and that a real difference, related to item difficulty, existed in rate at which subjects respond to vocabulary items. Taylor,[44] in his investigation of effects of various "cloze" procedures (involving, in part, deletion of certain words from passages), found significant learning scores indicated with each of three variations used (deletion of "easy," of "hard," and of "any" words). He also found that more stable, reliable, and discriminatory results were obtained, in general, with "easy" forms but that "any" and "hard" forms yielded equally significant learning gains and somewhat larger ones than did "easy" forms. Eberly's article[17] included a brief discussion relative to constructing tests so that scores obtained would reflect skills in the various kinds of comprehension called for.

Haberland[21] found three listening tests yielding considerably different results when correlated with scores on standardized reading tests. Marked relationships were found between listening-test scores and intelligence-test scores. Varied results relative to sex differences and to agreement with linguistic sections of standard reading tests were also found.

### Reading and Study Habits, Skills, and Relationships

Several studies dealt with influences of, and relationships among, various skills. In an investigation of interrelationships among rate, vocabulary, and comprehension, Reed and Pepper[39] compared "disabled" readers with groups who read "well" and with groups who read "poorly." They defined a "disabled" reader as one for whom there were found "extreme differences among the variables of rate, vocabulary and comprehension when these have been measured by the same test."(39:331.) Low scores in all areas were taken as indicative of "poor," rather than "disabled," readers; subjects scoring high in all three areas were considered to have potentials for reading "well." Using two of the three variables as a basis for classification, they found the number of cases falling in "disabled" categories considerably less than the numbers in "low" or "high" classifications. Out of 2,000 cases studied, only 26 were found to fall in a "high comprehension-low vocabulary" group. The investigators concluded that the operation of the three variables studied appeared to be the same among reading deviates as in a normal population; that subjects scoring high (or low) on two of the variables will be likely to score high (or low) on the third; that subjects scoring high on one variable, but low on a second, will tend to score higher on the third than will those who scored low on the first two variables; and that while rate, vocabulary, and comprehension appear to be related, the effects of any two variables upon the third appear to be additive.

Substantial relationships among several linguistic skills (vocabulary, speed of paragraph comprehension, and spelling) and between these skills and intelligence and scholastic success were found by Vineyard and Massey.[49] However, when the intelligence factor was controlled, they found the relationships of vocabulary and comprehension, of spelling and vocabulary, and of vocabulary and spelling with scholarship considerably reduced, although still significant; spelling-comprehension and comprehension-scholarship relationships were no longer significant. They cautioned that research yielding only zero order relationships between symbolic skills may be incomplete and misleading and that possibilities of common saturations need to be considered. Their conclusions included the belief that the vocabulary and speed of comprehension relationship "remains sufficiently strong to justify attempts to improve reading comprehension through vocabulary training,"(48:284) that the nonsignificant relationship between speed of comprehension and scholarship indicated that "programs in speeded reading can do little to influence the quality of scholarship,"(48:284) and that the reduced but still significant relationship of vocabulary and spelling with scholarship indicated that definite scholarship-improving possibilities were offered by vocabulary development and remedial spelling programs.

Berger[4] determined the chief popular news magazine preferences of over 900 seniors in colleges throughout the country, by analyzing questionnaire responses. He found the first five ranking choices to be the same for males, for females, and for the total group. These choices, in order, were Time, Life, Newsweek, U. S. News and World Report, and Saturday Evening Post. Only 5 per cent of the respondents listed no magazines at all and less than 1 per cent stated that they did not read any magazine. Weems,[49] however, concluded that "Johnny" does not read much and tends to be lacking in knowledge of world affairs. He discussed results obtained with two tests, one on contemporary and historical names and one on spelling given to freshmen journalism classes for several years. Among examples presented as "evidence" or bases for his conclusions were identifications of Tolstoy as a European country, of Socrates as "one of the old historians of China known for his brains," of Herman Wouk as the inventor of penicillin, and of Ogden Nash as a maker of automobiles.

Several reports dealt with, or had implications for, study habits, skills, and techniques. Among the significant correlations found by Bonner,[7] in his study of academic achievement of 260 freshmen at Alabama Agricultural and Mechanical College, was one between grade-point average and total study hours per week. Diener,[14] in his comparison of over-achieving and under-achieving groups at the University of Arkansas, found differences in time spent in study favoring over-achievers (and males). Differences in scholastic ability, however, favored the under-achievers (and males). While differences in time spent in work for pay favored under-achievers, no significant differences were found for time spent in extra-curricular activities.

Results of studies reported by Ausubel and by McClendon may also have possible implications for study techniques. Ausubel[2] induced an "explicit inteniton to remember" in a group of 44 undergraduates by announcing immediately after a test, over a studied selection, that an equivalent form of the test would be given two weeks later. A control group was given the retest unannounced. Differences in mean learning scores of the two groups and in per cent of material retained were not significant, leading Ausubel to conclude that the widely held belief that retention of learned verbal material is facilitatde by intent to remember was not supported. He suggested that longevity of learning could be increased only by inducing intent to remember at the time of original learning, rather than after the learning had occurred. McClendon[29] studied the immediate and delayed (5 weeks) recall of four groups of randomly selected college freshmen classes, each group listening to a lecture under different conditions: listening without taking any notes, recording only main points of the lecture, taking down as many details as possible, taking notes in the normally accustomed manner. He found that neither immediate nor delayed recall was affected significantly by any of the note-taking methods and that listening comprehension was as good when no notes were taken as when notes were taken by any of the three methods. He concluded that there was no justification for restricting note-taking or for advocating any special method. He further suggested that stress be placed upon "enhancing the efficiency of the students' customary, habitual note-taking methods consonant with the ultimate use to be made of the notes."(29:1737) Haberland[21] found little agreement between listening-test scores and academic achievement of an English group (students in regular freshmen English classes); however, close agreement was found in the case of a reading group (students below the mean of the freshman class in reading ability and enrolled in a reading-improvement course).

Skelton[42] studied 1,647 students matriculating at Alabama Polytechnic Institute, comparing those who had had a foreign language in high school with those who had not. The foreign language groups were superior on all of the six test-score areas on which compared, including reading comprehension, and on fall quarter honor-point averages. Two-and-one-half to three times as many non-foreign language as foreign language students were assigned to sections of remedial English. "Statistical analysis, reason, and the experience of generations" led Skelton to conclude that "study of foreign language does improve one's command of his own language, thereby enhancing one's control of subject matter in fields in which language is the field of instruction."(42:204)

### Reading Ability and Academic Achievement

Several reports had direct or indirect implications concerning the role of reading ability in scholastic or academic success, and such implications continued to be somewhat conflicting. Among the four (out of five) factors found to be significantly correlated with grade-point averages of the 260 college freshmen in Bonner's study[7] were Iowa Silent Reading Tests scores. Among the curricular changes recommended as a result of Tolle's attempt to identify "troublesome problems" of junior students in college[47] was the "expansion of the Reading Techniques program." Vineyard and Massey[48] found significant zero order correlations of college grade averages with vocabulary scores and with speed of paragraph comprehension scores. However, as pointed out previously, when intelligence was ruled constant, the vocabulary-scholarship relationship was considerably lower, although still significant; and the comprehension-scholarship relationship not only was reduced, but it failed to be significant. Significant differences in reading ability were found in Diener's comparison of over-and under-achieving college students, but the differences favored the under-achieving group. Two groups of bright (upper ACE quartile) Chico State College students, one group receiving freshman grade-point averages in the upper quartile and the other receiving averages below the freshman mean, were compared with respect to a number of criteria in Shaw and Brown's study.[40] No significant differences between the two groups were found for either Cooperative English Test scores or Whipple Reading Test scores.

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# A Rationale for Mechanical Methods of Improving Reading*

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It is apparent from even a cursory review of the reports of users of mechanical devices in improving reading that such devices seem to have certain values. Among the major values claimed are gains in rate of reading, and the improvement of such eye-movement characteristics as the elimination of regressions, reduction of the duration of fixations, increase in perceptual span, and reduction of the number of fixations. More recently, such claims have shifted from the emphasis upon eye movements to stress upon possible motivational values. Finally, a group of miscellaneous advantages are claimed such as reduction of vocalization, a mind-set or face-saving rationalization for breaking away from slow-reading habits, and attention or concentration reinforcement.

The wealth of available evidence cannot help but convince us that mechanical devices are effective in producing relatively permanent increases in rate of reading. How valid the claims for modification of eye-movement characteristics are we shall examine at length later. The evidence regarding the other attributes of mechanical training will also be explored.

In 1943 and 1946, respectively, Traxler[44] and Tinker[42] reviewed intensively the values of reading training controlled by mechanical devices. Their conclusions were largely negative in that they saw no justification for mechanical methods of training eye movements and little contribution of such methods to the broad act of reading. We have attempted here to review the literature reporting the results of controlled reading in studies subsequent to the two earlier reviews. It will be necessary to refer to some of the studies cited by Tanker and Traxler because they bear significantly upon the validity of a number of the claims offered. However, wherever possible we shall attempt to interpret and evaluate current claims on the basis of current research.

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### Mechanical Training and Rate of Reading

The primary purpose of most reading-training devices is improvement of rate. Many studies are reported to support this aim and to prove its accomplishment. However, these studies, as we shall see, leave many questions unanswered. We do not know, conclusively, how permanent any rate gain resulting from mechanical training is. We cannot be certain how this approach compares in efficiency of effort or time with other methods. We do not know its comparative values alone or in conjunction with other approaches. We are not sure of its specific values for word recognition, comprehension, or other discrete reading skills.

Many of the current research studies of the results of mechanical training are poorly constructed, inadequately controlled or statistically evaluated and, hence, are pointless or at best inconclusive. Studies by Allen,[1] the Air Force,[2] Anderson,[4] Barbe,[5] Bellows,[8] Causey,[11] Fiehler,[15] Jones,[20] Reach and Dotson,[33] Smith and Tate,[38] Staton and Maize,[40] and several studies by Witty[52 53] used mixed programs involving several other training approaches in addition to the mechanical. All showed gains in rate of reading but the contribution of the mechanical device, if any, cannot be evaluated. Typical of the equivocal results obtained in some of these studies is the report by Allen. In his study, the tachistoscope was considered least valuable by the participating officers. Drastic cut in the use of this device was made in a subsequent class and this group showed even greater gains in rate and comprehension than earlier groups. Just what these results prove is difficult to evaluate. Thus, all of these studies fail to answer conclusively any of the basic questions concerning the values of mechanical training other than that it apparently contributes to increase of rate.

Comparative evidence that gain resulting from use of mechanical aids is greater than that obtained by other methods is also lacking. Six studies which bear upon this question have been found: Sutherland[41] was unable to prove that tachis[illegible]scopic training for increased perceptual span results in i[illegible]creased rate. Weber[46] obtained similar gains in tachistoscopic and workbook training groups in rate and comprehension. Wedeen[47] found that a rate controller produced rate gains superior to those found in a group trained by workbook and lecture methods or those in an untrained control group. The superior rate gains for the rate controller group were present in a test using the machine but not in common reading tests. Thus Wedeen's results may truly indicate that practice on the rate controller results in ability to read faster when using this aid; not that the mechanical training transfers its effects in toto to ordinary reading. Westover[48] found equal gains from mechanically controlled reading and motivated practice in workbook-type exercises. Wilson and Leavell[51] found increases in rate of narrative reading for groups trained by the Reading Rate Accelerator or by accelerator plus tachistoscope. Groups trained by tachistoscope alone, by a reading skills program, guided free reading or a study skills program gained less.

Other comparative studies are available but tend to yield somewhat contradictory results. Barry and Smith[6] found no significant differences among seven groups employing slightly different materials and methods. All showed appreciable improvement on reading tests. The group using the Iowa films showed gains similar to that in a control group in which "no special treatment" was used. If we may understand that the control group was given no actual reading training, then in this experiment the use of films appeared to produce no more gain than normal maturation. In a very carefully controlled study, Freeburne[16] contrasted rate gains resulting from perceptual span training, perceptual speed practice and no formal training. The experimental groups did not show any more gain than the control group when tested by several reading tests or by a test using the tachistoscope. Another study by Glock[18] contrasted two different types of film presentation with a control group given motivated practice. Like Freeburne, Glock found that teacher variances were more significant than method variances. No one method was best in the hands of all teachers. Lewis[23] compared eye-movement training with lectures and motivated reading. The latter group showed significantly greater gains in rate. Manolakes[25] found superior rate gains in groups trained by rate controller than by rate controller plus tachistoscope. Measurements of eye-movement characteristics failed to show that the combined training contributed to their improvement any more than did the rate-controller device alone. Thompson[43] found significantly greater gains in rate resulting from a rather stereotyped book-centered course than from use of the rate controller or no reading training with no significant changes or differences in comprehension among his groups. Surprisingly enough, losses in flexibility in adapting rate to difficulty of material was greatest in the book-centered group.

Wooster[54] found no contribution to rate or comprehension in use of the rate controller as a supplementary part of a course in reading and study skills. Both experimental groups (with or without controller) and the control group given no training showed significant rate gains but losses in comprehension. There appears to be little evidence in these various studies that use of any of several mechanical devices consistently produces greater improvement of rate of reading than any of several other approaches. While the training devices do seem to contribute to rate increases, in more carefully controlled experiments this contribution is as often a reflection of teacher variance and perhaps a motivation as it is an intrinsic result of the method.

### Mechanical Training and Word Recognition

One final group of studies is available bearing on the values of the tachistoscope in improving accuracy of word recognition. Unfortunately for our purposes, all three studies are so poorly planned that their results are inconclusive. Anderson's[4] results indicate that 95 per cent of the seventh graders learned the words offered in a twelve-week period of training. However, the lack of a control group leaves no indication of the relative efficiency of this learning. Davis[13] conducted digit training with a tachistoscope in a first-grade class. In a post-training word recognition test, the class median was then compared with previous class medians on a second, different reading test, not given to the experimental group. The confused planning of this experiment leaves us with no real means of evaluating the results. Renshaw's[34] training of word recognition by tachistoscope among first graders is similarly inconclusive. Thus these three studise of the possible values of mechanical training for word recognition yield no usable facts.

### Mechanical Training and Eye Movements

A subordinate goal often offered for mechanical programs is the training of eye movements. We shall consider in detail the validity of such training for eye-movement characteristics such as regression, fixation duration, perceptual span, and number of fixations. Inherent in the goal, however, is the assumption that regular eye movements determine good reading or, as a corollary, that regular eye movements are characteristic of efficient readers. This basic assumption and its corollary are both suspect. Sisson[37] and Walker[45] have shown that there is little evidence of habit or pattern of rhythmical eye movements (same number of fixations per line) in either easy or difficult material or in long or short lines. Ledbetter[22] found significant differences in eye movements for reading in various content fields. Siebert[36] found practically no relationship between "good eye movements" and "good" comprehension in varied subject-matter fields. Anderson's[3] comparison of good and poor readers concluded that two important determinants of regularity in eye movements were difficulty of the material read and the purpose of the reading. Fixation frequency, regression frequency and pause duration increase for both good and poor readers when handling difficult material, although good readers show greater flexibility in adjusting to this material. Tinker[12] cited a half dozen older studies which indicated, in his words, "that oculomotor reactions are exceedingly flexible and quickly reflect any variation in the central processes of perception, apprehension and assimilation." These studies are confirmed by Gilbert's[17] study in which eye-movement records showed relationships to intelligence and reading-test scores in meaningful material.

These indications might be summarized simply as showing that, first, eye movements reflect the difficulties of the reader in sight word recognition, word analysis and comprehension. There is little reason to believe that irregular eye movements cause poor reading. Secondly, irregularities are present in the eye-movement patterns of both good and poor readers, particularly when they are attempting to read difficult or unfamiliar material. Gilbert again stresses the fact that eye-movement records do not accurately predict reading-test performances.[17] They do not discriminate adequately between good and poor readers. Perfect rhythmical eye-movement patterns exist only theoretically, or possibly when one is reading fluently in extremely simple material. Therefore, the concept that eye movements should be subjected to training in the hope of improving reading is extremely tenuous.

**Regression.** Eye movements in the opposite direction to that necessary for the nature of the language being read are often considered indicative of faulty reading and as worthy of correction. Contrary to this common interpretation, Bayle[7] shows that regressions are not always a reflection of lack of word recognition or word-by-word reading. She distinguishes six types of regressions: 1) after first fixation in the line; 2) within the line, when the span of vision is overreached; 3) for verification; 4) during word analysis; 5) for phrase analysis, and 6) for re-examination of a whole line. She considers many of these types essential to accurate word recognition and thorough comprehension. In another study of the eye movements of good and poor readers during oral reading, by Fairbanks,[14] it was found that regressions apparently do not cause errors in reading but reflect errors that are central (intellectual) in origin. Fairbanks' observations support the essentiality of such types of regressions as the last three noted by Bayle, above. Other experimenters indicate that the number of regressions is indicative of the demands made by the material (style, content, vocabulary, etc.) as well as the reactions and attributes of the reader such as intelligence, purpose for reading, readiness for ideas or vocabulary, fatigue, interest, etc.

If these observations are accepted, the complete elimination of regressions by mechanical training might well result in more superficial reading with actual increase in dependence upon context for word meanings, and decrease in detailed as well as general comprehension, a result that has been observed in several studies of the outcomes of such training. The reduction of those types of regressions which do not contribute to more accurate reading, cannot, in our opinion, be attempted successfully without also influencing more essential types.

**Duration of Fixation.** The average fixation time is another eye-movement characteristic that has been extensively studied. In his large-scale study, Gilbert[17] found that the small relationships between average duration of fixation and reading-test scores were highest in the primary grades and diminished markedly thereafter. Buswell[10] suggested that this trait is possibly physiologically determined since it decreases with age without training and is fairly constant at a given age for a given individual. Perry and Whitlock[30] consider the duration of fixation dependent upon vocabulary level, familiarity with the content of the reading matter and other elements of comprehension.

It is probably true that the average duration of fixations is slightly reduced as rate of reading increases. This speedtion or ordinary classroom instruction as it does as a result ing-up occurs quite as readily, however, as a result of matura- of mechanical training. Extended practice in perceptual speed or reading constant amounts of digits or prose at increasing speeds does not appear to be highly economical of time and expense.

**Perceptual Span.** Probably the most frequently mentioned goal of mechanical training is increase in perceptual span. Aside from the previously cited studies (Freeburne, Glock, Sutherland, Westover, Weber) which obtained negative results in rate of reading from perceptual-span training, a number of writers have questioned the relationships of the trait to good reading. Luckiesh and Moss[24] claim that perceptual span has never been shown to be related to good reading. Span, as measured by the tachistoscope, predicts eye movements in the act of reading very inadequately, according to Robinson.[35] The studies of good and poor readers by Anderson,[8] Fairbanks,[14] Sisson,[37] Sommerfield,[39] Sutherland,[41] Walker,[45] and others cited by Tinker[42] indicate that size of perceptual span does not discriminate accurately between degrees of reading ability. Perry and Whitlock[31] point out that size of span is not a constant characteristic. Spans overlap in the act of reading and, as they discovered in attempting to create reading films, even slow readers appear to use phrases of greater than minimum size.

The terminology used by many writers in this area is somewhat confused. Perceptual span, recognition span and visual span are used interchangeably, even though they are not synonymous. Visual span refers to the 4-8 characters perceived sharply in the area of foveal vision. Recognition, comprehension or perceptual span refers to the 24 to 25 letters of 10-point type which, although they are perceived by less sensitive areas of the retina, are more or less successfully recognized. In connected reading, perceptual span is usually about eight letters for normal readers.

In effect, perceptual-span training attempts to increase the accuracy (and often the speed) with which the student recognizes characters seen vaguely in the periphery of the fovea. As Perry and Whitlock point out, this training is frequently highly artificial. The 4-8 letters forming the normal perceptual span do not correspond to the conventional division of phrases at a point between words, or in "natural," logical or thought groups determined grammatically. Thus it appears that much perceptual-span training includes more matter than the reader usually recognizes in reading connected material. Devices which pressure the student to recognize ever-increasing spans of digits, words or phrases are unrealistic about the span actually present in continuous reading or the physiological limits of the visual span or the perceptual span.

Controller fixation training as used in the Harvard films[31] or the Perceptoscope filmstrips[20] are examples of perceptual-span training which is realistically oriented to the normal reader's usual span of perception. The words exposed in each controlled "fixation" overlap from one exposure to the next. Thus the student is not forced into attempting to use a perceptual span which is unnaturally artificial or too great. In our opinion, this approach is more defensible than the use of constantly increasing spans or fixed "fixations" which are constantly greater than the reader would normally use.

There is evidence in these studies to clarify some of the contradictory or confused results of many experimental attempts to increase span. The lack of marked relationship between perceptual span measured tachistoscopically and reading rate may well be due to the lack of correspondence between perceptual spans used in training and those present in continuous reading. The failure of many experiments in increasing perceptual span to produce significant gains in rate of reading (Freeburne, Glock, etc.) may be similarly explained.

In summary, it appears from this discussion of perceptual span, that training as now most commonly used, may be psychologically and visually faulty. We shall attempt later to interpret why some of these training programs appear to effect reading rate even though they do not effect a transfer from tachistoscopic perceptual span to reading perceptual span.

**Number of Fixations.** A fourth subordinate goal of eye-movement training devices is often the reduction of the number of fixations. Tinker[42] considers this trait to be highly related to reading speed, but the evidence of Gilbert,[17] Anderson,[3] and a number of other studies does not confirm this opinion. Needham[28] and Sisson,[37] for example, found little consistency in this aspect among good readers. Anderson[3] found no reliable difference in fixation frequency for good and poor readers in difficult material. Morse *et al*,[26] also, found no consistent variation with the difficulty of the material read, but recognized the importance of individual or genetic factors. He pointed out that lack of adjustment to varying aspects of the reading material is more characteristic of immature or poor readers. Developmental, individual or maturational factors apparently far outweigh the factor of difficulty of material. Morse interprets his results to cast grave doubt on the advisability of pacing devices. He believes that training all children in a fixed pattern of eye movements would operate in opposition to the reading process as we find it functioning in children. In working with good readers of college freshman age, Walker[15] found significant differences in fixation frequency between passages varying from easy to difficult, and in reading motivated by different purposes. Anderson's poor college readers[3] did not vary in fixation frequency according to purpose as much as Walker's group. But fixation frequency did vary more with purpose than with changes in difficulty.

It appears that fixation frequency is not highly related to reading speed. Differences between good and poor readers are not consistently large or significant. While some individuals, particularly good readers, tend to be consistent or tend to show an habitual fixation pattern, fixation frequency is markedly influenced by the purposes of the reader and a number of his individual characteristics. Difficulty of the material, familiarity of the content, as well as format also influence the pattern of fixations. If these elements of the reading situation and the reader modify fixation frequency to a significant degree, training intended to produce a fixed pattern seems unrealistic.

### Other Values of Mechanical Training

There are a number of minor claims made for the use of mechanical devices in reading-improvement programs. To our knowledge, none of these have been subjected to scientific scrutiny. Some devices are acclaimed because they provide the opportunity and physical setting for more concentration on the act of reading by providing a point of mental and visual focus, and by eliminating extraneous stimuli such as light and noise. Many clinicians have observed the rapt attention with which their students follow the operations of almost any reading-training device.

Certain devices are said to reduce vocalization or lip and tongue movements since the rapidity of the presentation of the reading matter permits little opportunity for the voco-motor speech processes to appear. Some clinicians believe that rapid reading cannot be achieved without the almost complete extirpation of speech movements. It is undoubtedly true that if gross speech movements accompany silent reading, rate of reading is depressed almost to the level of speaking rates. As every primary teacher knows, elimination of gross speech movements tends to produce true silent reading and to increase silent reading rate. However, there is a belief in some sources that subvocal speech movements cannot, or perhaps should not, be entirely eliminated. To employ mechanical-training devices with this latter aim in mind is questionable, in their opinion.

Pilant[32] mentions another goal of mechanical training which is becoming increasingly recognized. He says,

> This awe of the machines does help create a proper mind-set for breaking with old habits and putting on new virtues. But it also tends to mislead the mediocre into believing that the machine will do what the mind cannot or the will is too lazy to attempt.

In this same strain, Wilking[49] has noted that many college students do not read rapidly because they are afraid that if they attempt to speed up they lose comprehension. Training devices compel them to progress at reasonable rates and they soon discover that they are still able to comprehend. He also notes the values of intrinsic motivation, attention-getting novelty, and the blandishments of the scientific approach. Other clinicians have noted that mechanical devices can provide supportive therapy for the insecure slow reader, reassurance of successful comprehension at higher rates for the perfectionistic slow reader, and help produce rather dramatic and sudden gains for the habitual slow reader of high academic potential and good language facility.

Perry also stresses the students' confidence in improvement in the skills trained by the device. He says,

> We believe that this aspect of confidence in improvement may explain why devices which give evidence of improvement of "visual span" (to students whose visual span is already larger than they need for the best of reading) produce the results they do produce in the hands of teachers who are themselves persuaded and persuasive.[30]

### Mechanical Training and Permanent Gains in Rate

Several studies give evidence that the rate gains achieved by mechanical training have some degree of permanency.[3 9 13]

[27, 46] The retention of improvement in rate (long-range improvement divided by initial improvement) varies from 51 per cent to 84 per cent six to twelve months after training. Comprehension scores remained fairly constant in these same studies. If these results are fairly typical of training courses using mechanical devices, they offer a partial answer to the question of the permanent values of such training.

In reviewing the literature on the use of mechanical devices for reading improvement, we have found little evidence that various mechanical devices produce greater improvement in rate of reading than other approaches. Training intended to modify eye-movement characteristics such as regression, duration of fixation, perceptual span, or number of fixations is highly questionable. These eye-movement characteristics may not be amenable to training since they, like reading success, are significantly determined by the nature of the reading material and attributes of the reader. Other goals of mechanical training, such as motivation and reinforcement of attention or concentration are as yet unsubstantiated by research evidence, although they are supported by clinical evidence and the opinions of skilled observers.

### What Does Mechanical Training Accomplish?

Since mechanical-training programs do apparently contribute to relatively permanent growth of rate of reading, it is not appropriate to dismiss their use as insignificant. Given this value, it is possible that, as Perry and Whitlock have suggested, the devices may be modified to produce even more significant results. If the training does not directly modify eye movements, what then does it do? How does it produce changes in reading speed? Could these changes be accelerated by modification of the mechanical approaches now in common use?

We should like to offer several hypotheses regarding the training materials and the emphases of the common mechanical-training program. The review of the literature has shown that much of the training material (digits, phrases, words) is arbitrarily chosen. It is offered in gradually increasing spans and at increasing speeds of recognition. These arbitrary training groups are often too great for true apprehension, and are considerably larger than the perceptual spans commonly used by normal readers. Yet this practice, with widening phrases at increasing speeds, does appear to contribute to acceleration of rate. How does practice with material which, in the final analysis, does not actually resemble that used in the act of reading, promote more rapid reading? Is it possible that such training is, in effect, merely training in quicker visual discrimination? Does some transfer occur to the act of reading because the student is trained in more rapid and more accurate recognition of word gestalts, or in the reduction of cues needed for word recognition?

### What Should Mechanical Training Emphasize

We should like to suggest that mechanical training is successful in accelerating rate because the student is in effect being taught to read with fewer cues, to guess more readily what he sees peripherally, to overcome the caution exhibited in slow or word-by-word reading, to be more confident in dealing with vague or indistinct portions of words, not because of any actual increase in perceptual span or other changes in eye movements.

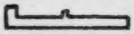
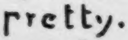
It is now generally accepted that reading beyond the most primitive levels is achieved by the recognition of word wholes or a group of characters. Gray's[19] research in reading in a variety of languages proves that regardless of the nature of the language or the type of early training, adult or good readers read by recognition of groups of symbols. In our language, reading is accomplished by recognition of word shapes or gestalts, identified by the gross shape, the initial letters, letters which protrude above the line, the context, and cobinations of these and other minimal cues.

Recently, training in visual discrimination has been emphasized in reading readiness and beginning reading programs. This training has been offered to facilitate quicker and more accurate recognition of first, geometric forms and figures and, later, of words.[50] In work with retarded readers, some reading clinics emphasize similar training in visual discrimination, in recognition of words by configurations and other visual cues. Many other studies such as that of Krise[21] have stressed the significance of accurate visual perception in successful reading. Collectively, this evidence seems to indicate the values of training in more rapid and more accurate visual discrimination. There is sound basis for stressing such training as a direct contribution to quick recognition of words and groups of words.

We are suggesting then that mechanical devices should be used, first, to improve visual discrimination and perception and, secondly, to improve rate of reading. The principles and materials of this approach might be outlined somewhat as follows:

1. Practice with tachistoscopic exposure of simple geometric forms to sharpen visual discrimination. Students are to copy these forms and to avoid attempting to verbalize what they see. Exposure time should very with age of students from half a second to one-fifth of a second. Shorter exposures are unnaturally faster than average pause duration.[10]

2. As accuracy of discrimination increases, shift to gross word forms or shapes or incompletely printed words equal in span to 8-10 letters of 10-point type. Promote insight into what is occurring by discussion of the nature of the act of reading, the limitations of visual span, and the necessity of more accurate recognition of material seen peripherally. In introducing each group of word forms, identify the group, thus providing contextual clues. Use outlines of names of prominent people (politicians, movie stars, etc.), of geographical places (cities, states), of buildings and other proper names. Later use outlines of common nouns, verbs, adjectives, etc.

   These exercises are pencil outlines of the shape of words, as Eisenhower  or incomplete words, as . Initial letters, tall letters and other clues may be added as desired or necessary. The configurations chosen for practice should be common words well within the students' auditory and speech vocabularies.

3. As accuracy of recognition of word forms increases, increase span of recognition material gradually to 15-20 letters. Increase speed of exposure to one-tenth of a second, after high degree of accuracy is achieved. This training is not intended to increase perceptual span but rather to condition students to quick recognition of ideas or concepts expressed in more words than can actually be seen clearly.

Discuss with class the lack of visual acuity in peripheral vision, and the need for confidence in dealing with the vague extremes of the span of material. Encourage guessing and use of context clues.

At this stage, use related phrases drawn consecutively from continuous material.

4. Then shift to continuous material, such as the Harvard Films, Series Two,[31] or the Perceptoscope[29] training materials. If average reading rate of group permits the arbitrary rate increases present in the Harvard films, continue with them. If individual differences are to be met, or rate of reading is actually to be adapted to the present level and growing capabilities of the group, then use the Perceptoscope films. Use the three-fixations-per-line pattern first, then the two fixations. Gradually increase speed of these as accuracy of comprehension (70-80 per cent) is maintained. Shift to shade pattern after 360 words per minute is achieved by group with at least 70 per cent comprehension.

This progression from groups of geometric forms, to word shapes, to incomplete words, to related phrases is to convey to the student some insight into his purpose. He should realize clearly that he is trying to recognize word forms more accurately and eventually more rapidly with only minimal or gross clues to aid him. Perhaps this sequence is not essential. But judging from the evidence of the values of these various materials in reading readiness, remedial reading and other studies of perception, each type of material will contribute to the goal of improved visual discrimination and perception. Even college students and adults vary distinctly in accuracy of visual discrimination and perception and, in our opinion, would benefit from such training.

Ideally, the student should practice individually and control the duration of fixation, since this varies with individuals from one context to another. If this is not mechanically feasible, or group instruction is to be used, then the instructor should keep the speed of exposures to a level that is comfortable for the slowest third of the group, as determined by present reading rates. Speed is to be de-emphasized in all except perhaps the last stages of this training in favor of accuracy of recognition of perhaps 80-90 per cent. Speed will increase spontaneously as visual discrimination and perception improves. Transfer of the training will manifest itself in increased reading rate without emphasis upon speed during most of the program. The purpose of the training is to promote more accurate recognition of word forms, which is fundamental to rapid rate of reading and, in our opinion, must be brought to a high level before growth in rate is feasible.

Certain cautions must be observed in selecting students for the perceptual training. We do not share the opinion that practically all persons can be taught to read more rapidly. We would permit only the following types of readers to enter this program:

1. Those scoring low in rate, but distinctly higher in comprehension of the same material, i.e., the slow, cautious, retentive reader.
2. Those scoring higher in an untimed power test of comprehension than in a timed test or in comprehension of timed material.
3. Those scoring distinctly higher in the untimed administration of a general vocabulary test than in timed administration.
4. Those clinically identified as habitually slow readers, lacking in flexibility, who tend to use the same rate in most materials, but show acceptable comprehension.

We would exclude from this program any students whose reading performances do not meet the first three criteria and those showing any coordination or fusional difficulties or tendencies to suppression.

Parry and Whitlock[30] offer several other criteria of a mechanical-training program which are relevant at this point. They suggest that the device should first produce striking evidence of the student's improvement in whatever skills it demands. Secondly, improvement must be readily associated in the student's mind with the regular reading process. They imply that the training must resemble as closely as possible the subjective experiences of regular reading. These similarities should be present, they suggest, in the use of continuous material, permitting normal return sweep, with readability controlled to discourage regression, with rate controlled, with material constant in difficulty so that students may observe improvement in rate, with length and duration of fixation controlled, and with gradients of acuity in peripheral vision.

Finally, to insure transfer, they suggest that the skills demanded should objectively resemble those which it is desired to train. Although these criteria were evolved to aid in the development of an improved version of the Harvard Reading Films, they are applicable also to our suggestions here.

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